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The Steam Battery "Monitor."

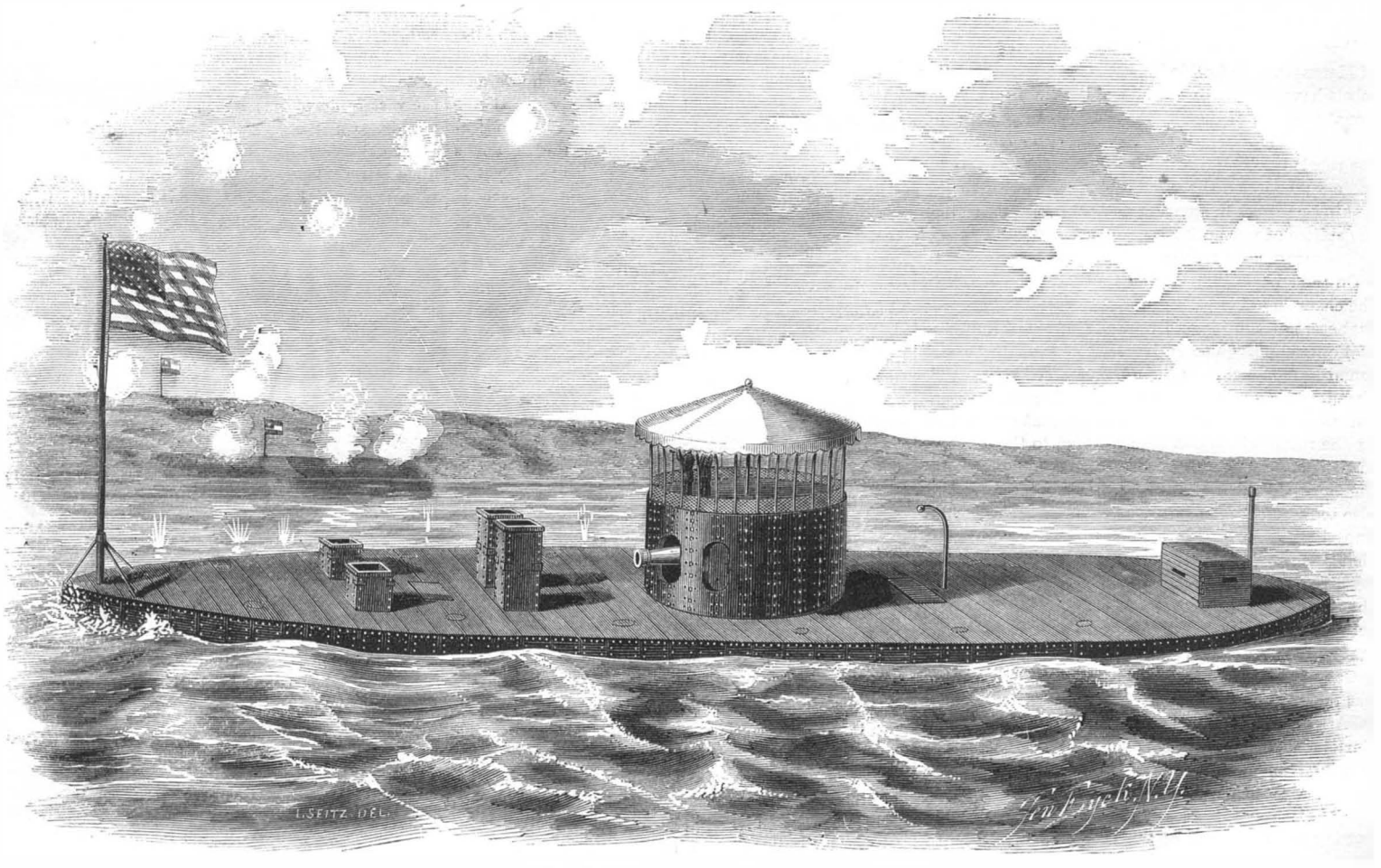
We present herewith a perspective view of the Ericsson steam battery, engraved from a drawing which was made by our artist while the vessel was lying at the Brooklyn Navy Yard, just before she sailed on the trial trip which has proved so full of important and exciting events.

On page 331 of our last volume we gave a full description of this battery, but will repeat the principal dimensions. The upper section of the veseel is in the form of a flat-bottomed scow, with sharp ends and vertical sides, 5 feet deep, 174 feet long and 41 feet 4 inches wide. The central portion of the bottom is cut out for a length of 124 feet and a width of 34 feet, to communicate with the lower section, which is attached to the bottom of the scow, and which extends down with inclined sides to a depth of 7 feet 6 inches The lower section is built of iron, the plates being ½ inch in thickness. The upper section is built very strongly of wood and iron, the vertical sides being of solid oak 30 inches in thickness, covered by one-inch rolled iron plates to the thickness of 6 inches. The propeller and rudder, being under the projecting end of the upper section of the vessel, are securely protected from shot.

The principal novelty of this vessel is the cylindrical revolving turret in which the guns are placed. This is formed of rolled one-inch iron plates bolted together to the thickness of 8 inches; its internal diameter is 20 feet and it is 9 feet high. It rests at its lower edge on a smooth, flat ring of composition metal, but when in action the principal portion of its weight is sustained by a central shaft, about which it revolves; a massive wedge being driven below the step of the shaft on such occasion to raise it, and thus cause it to bear up the turret. A large spur wheel upon the shaft is connected by a train of gearing with a small steam engine, which supplies the power for turning the turret.

Two 11-inch guns are placed within the turret in position precisely parallel with each other, on smooth ways, or slides; a clamp being arranged upon the sides of the ways for adjusting the friction and taking up the recoil in such distance as may be desired.

The turret is pierced in different places with four holes for the insertion telescopes, and just outside of the holes reflectors are fixed to bend the ray of light which comes in a direction parallel with the guns through the axis of the telescope, which is crossed by a vertical thread of spider's web through the line of collimation. The sailingmaster takes his position in the turret, with his eye to the telescope and his hand upon the wheel that governs the motion of the small engine, and turns the turret so as to keep the guns always directed with absolute precision to the object against which the fire is directed. A scale is also arranged for adjusting the elevation of the guns with similar engineering precision, and it would seem that the firing should be directed with unprecedented accuracy.



THE ERICSSON STEAM BATTERY "MONITOR."

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cessary for us to say that we comply with the suggestion with the most hearty acquiescence. While so many thousands of our countrymen are enduring the labors and sufferings of the campaign, and hundreds are pouring out their hearts' blood for the salvation of the nation, we who stay at home should certainly do nothing to embarrass the military operations. Should the occasion for privacy, however, be soon removed we shall probably publish these views with a perspective of the interior of the turret.

Our engraving represents the battery as ready for sea. In preparing for action, the awning over the turret is removed and the square smoke stacks as well as the shorter pipes, through which air is drawn into the vessel, are taken down. The small square tower at the end is the wheelhouse in which the steersman stands. It is made of bars or beams of iron 9 by 12 inches interlocked at the corners.

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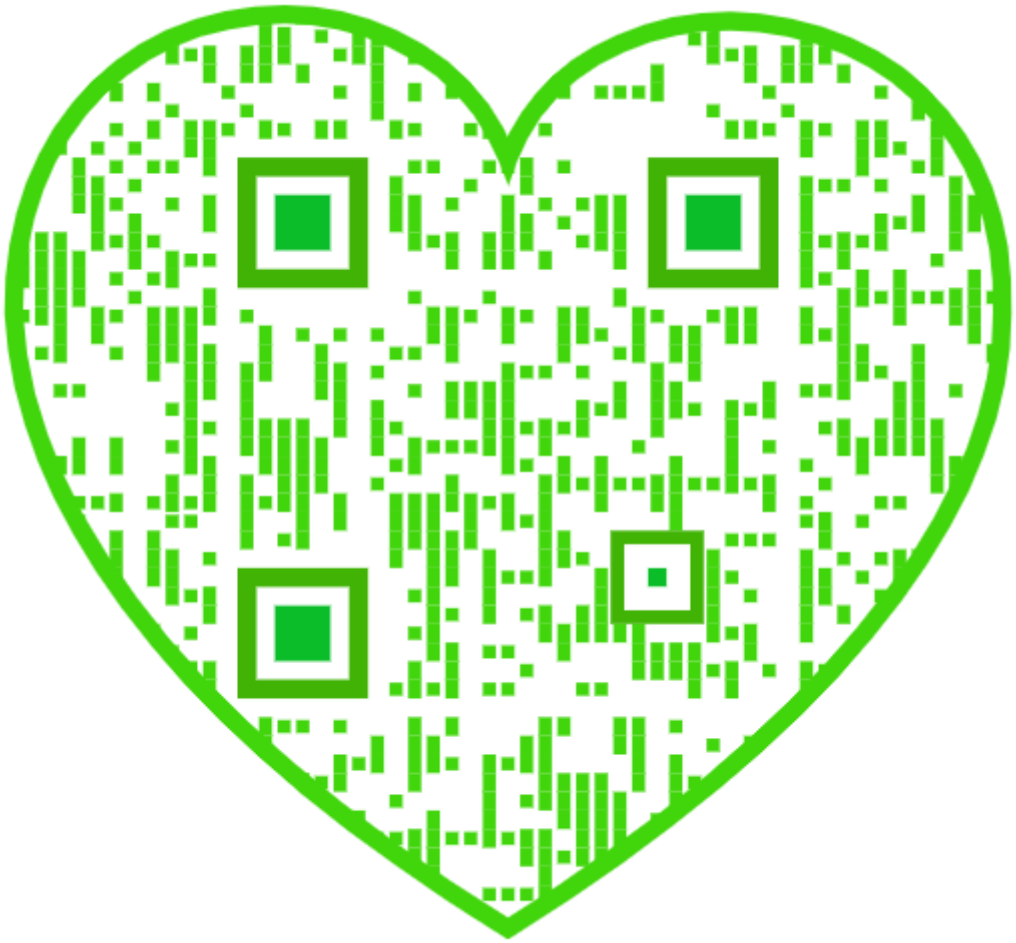

When iron turrets were first proposed, it was apprehended that the concussion in the interior would prove intolerable to the men who were working the guns, and experiments were made in England to test the matter. It was found that when the turret was entirely closed, the men could not indeed bear the concussion, but on making a sufficient opening in the top, the difficulty was completely obviated. The result of this investigation was known to our Navy Department before the contract was made for the Ericsson battery. After the battery was completed her 108-pounder guns were fired a few times to test the effect of the concussion on the turret and on the men within it, and no inconvenience was experienced. Capt. Ericsson informs us that he requested one of the officers to observe the effect carefully, and the gentleman says that with his hand upon the side of the turret when the gun was discharged, he could not feel the slightest jar, and that the man in the shell room directly below the turret, with the iron hatch tightly closed, actually did not know when the gun was fired!

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE ROLLING BACK OF THE REBELLION.

Along the whole line, from the northwest corner of Arkansas to the eastern edge of Virginia, the discouraged and demoralized troops of the rebels are falling back before the steady and irresistible progress of the government forces. The good news which we recorded last week of the evacuation of Columbus, the stronghold of the West, is followed this week by the still more important intelligence of the evacuation of Manassas, (the fortified camp in the East, where the rebels have so long insulted and threatened the national capital), of a great victory in Arkansas and of a naval battle in which the most formidable vessel of the rebels has been discomfited by a little government battery; while on the coast the national forces are making progress in securing new points and extending the sphere of our authority.

CAPTURE OF FERNANDINA AND ST. MARY'S.

On the 2d of March Commodore Dupont sailed into the channel which separates Amelia Island from the east coast of Florida and took possession of the town of Fernandina, which is situated on the island. He found Fort Clinch, on the north end of the island, abandoned, and raised the national flag on its ramparts. This is the first of the forts that were seized by the rebels which has been restored to the government; may we soon have the satisfaction of recording the restoration of the last. Commodore Dupont also took possession of the town of St. Mary's without opposition. He says in his dispatch that the report that the fortifications of St. Simons, armed with heavy columbiads, are abandoned, is confirmed, and that the entire sea coast of Georgia is now either actually in his possession or under his control.

THE GREAT VICTORY IN ARKANSAS.

One of the most important battles of the campaign has taken place at Pea Ridge, in the northwest corner of Arkansas, between the Union army under General Curtis and some 25,000 rebels under Van Dorn. The fighting continued three days, and resulted in the complete route of the rebels. The notorious rebel, Ben McCulloch, was killed, and at last accounts our cavalry was in pursuit of the flying enemy in hopes of capturing the commander, Van Dorn.

It appears by the official report of General Curtis that our army was attacked on Thursday, the sixth of March, by the forces of the rebels, which were concentrated against our right wing, under Gen. Sigel. The attack was steadily sustained and finally repulsed. During the night General Curtis changed the position of his forces, and the next morning the fight was renewed, and it continued throughout the day. On the third day it was resumed, when General Curtis ordered a charge along the whole line, which effected the complete route of the rebels, "who retired in confusion, but rather safely, through the deep, impassable defiles of the cross timber."

THE EVACUATION OF MANASSAS.

The most important event of the campaign is the evacuation of Manassas. At 9 o'clock in the morning of Tuesday, March 11th, the New-Jersey volunteers entered the famous stronghold and hoisted the stars and stripes over the deserted works. It is thought that the evacuation has been in progress for two or three weeks. The guns were all removed, but there are reports that stores in considerable quantity were left behind. The barracks of the rebels were built of logs, and were of sufficient extent to acccommodate 100,000 men. The evacuation was accompanied by the withdrawal of the batteries which have so long blockaded the Potomac below Washington. Nothing is publicly known of the destination of the great army that has so silently withdrawn from Manassas, though fears are expressed that it may be the intention of the commanders to fall back upon Burnside's army, or some others of our detachments, and annihilate them. It is to be hoped, however, that General McClellan will follow up the retreating forces with sufficient vigor to prevent them from doing any considerable mischief in any quarter.

Though the country is very properly jubilant over the great and general retreat of the rebel forces, it is not to be forgotten that these forces are still formidable, and if concentrated by an able and energetic commander they might still deal some serious blows upon our vastly-extended line. We believe, however, that any such enterprises would be but the expiring throes of the monster whose doom is slowly but surely approaching.

Electric Telegraphs in Russia.

M. A. Komaroff—a Russian, apparently—has contributed an article on electric telegraphs in Russia to the last number of the *Revue Scientifique des Deux Mondes*, in which there are some curious statements He says that the introduction of electric telegraphs was as much opposed in Russia as railways in the Roman States. "Governments like the Russian always look with suspicion on improvements; in this respect they sympathize with the feelings of savages at the sight of scientific experiments." "Russia," he continues, "is the country in which the ideas of the illustrious philosopher, Ampere, were first applied; and yet it was the last country in which any attempt was made to bring them into practical use." The Emperor Nicholas looked upon the electric telegraph as a revolutionary engine. After his death, a network of electric lines was laid down, which now extends over 10,000, and will shortly exceed 12,000 English miles. In 1860, these lines transmitted 465,000 telegrams. In 1832, Baron Schilling de Kanstadt, a councilor of state in the service of Russia, constructed an apparatus with two wires of transmission and one magnetic needle; and, for the use of this machine, invented a combination of letters and figures, and even arranged for the ringing of a bell to call attention when the machine began to work; but his premature death prevented his bringing the apparatus into practical use. The first important line in Russia, from St. Petersburgh to Moscow, was opened for the exclusive use of the railway authorities and the Government, in 1852. At present, the network extends from Torneo to Odessa, from Warsaw to Omsk or Tomsk in Siberia, and is being every year pushed forward, so that we may eventually expect it to reach the confines of China, and be united to the lines which must very soon branch from Pekin. The difficulties of keeping the Russian lines in working order are very great. Snow storms, icicles of enormous dimensions, thunder storms and heavy fogs, constantly interrupt communication, and break down the poles erected across hundreds of miles of barren, howling deserts.

SILK CULTURE IN AMERICA.—As early as 1623 the cultivation of silk commenced in the colony of Virginia. In 1759, the colony of Georgia exported 10,000 lbs. of raw silk, which sold for two to three shillings higher per pound than that of any other country. In 1771, the cultivation began in Pennsylvania and in New Jersey under the auspices of Dr. Franklin and other enterprising gentlemen. In Connecticut, the cultivation commenced about the year 1790, and the value of the raw material and sewing silk made in three counties in that state in 1810, amounted to 28,503 dollars. In Texas much has been done within the past few years to establish its success among the German settlements in the western section. The greatest difficulty connected with the silk culture is the care required in attending the cocoons,

THE past winter has been of unusual severity in Russia. A great number of persons have been frozen to death.

Materials in their Invisible State.

If a piece of silver be put into nitric acid, a clear and colorless liquid, it is rapidly dissolved and vanishes from the sight. The solution of silver may be mixed with water, and to appearance no effect whatever is produced. Thus, in a pail of water we may dissolve and render invisible more than ten pounds worth of silver, lead and iron; but every other metal can be treated in the same way, with similar results. When charcoal is burned, when candles are burned, when paper is burned, these substances all disappear and become invisible. In fact, every material which is visible can, by certain treatment, be rendered invisible. Matter which, in one condition, is perfectly opaque and will not admit the least ray of light to pass through it, will in an other form become quite transparent. The cause of this wonderful effect of the condition of the matter is utterly inexplainable. Philosophers do not even broach theories upon the subject, much less do they endeavor to explain it. The substances dissolved in water or burned in the air are not however destroyed or lost.

By certain well known means they can be recovered and again be made visible; some exactly in the same state as they were before their invisibility; others, though not in the same state, can be shown in their elementary condition; and thus it can be proved that having once existed, it never ceases to exist, although it can change its condition like the caterpillar, which becomes a chrysalis, and then a gorgeous butterfly. If a pailful of the solution of silver be cast into the stream, it is apparently lost by its dispersion in the water; it nevertheless continues to exist. So when a bushel of charcoal is burned in a stove it disappears, in consequence of the gas produced being mixed with the vast atmosphere; but yet the charcoal is still in the air. On the brightest and sunniest day, when every object can be distinctly seen above the horizon, hundreds of tuns of charcoal, in an invisible condition, pervade the air. Glass is a beautiful illustration of the transparency of a compound which in truth, is nothing but a mixture of the rust of three metals.

The power of matter to change its conditions from solid capacity to limpid transparency causes some rather puzzling phenomena. Substance increases in weight without any apparent cause; for instance, a plant goes on increasing in weight a hundred fold for every atom that is missing from the earth in which it is growing. Now the simple explanation of this is that leaves of plants have the power of withdrawing the invisible charcoal from the atmosphere, and restoring it to its visible state in some shape or other. The lungs of animals and a smokeless furnace change matter from its visible to its invisible state. The gills of fishes and the leaves of plants reverse this operation, rendering invisible or gaseous matter visible. Thus, the balance in nature is maintained, although the continual change has been going on long prior to the creation of the "extinct animals."—*Septimus Piesse.*

Doctors Taking their own Medicine.

Dr. Oliver Wendell Holmes tells us how the members of the medical profession feel when the "poisoned chalice" of their prescriptions is commended to their own lips; in other words, when the visitor becomes the visitee:—

Just change the time, the person and the place,
And be yourself the "interesting case;"
You'll gain some knowledge which 'tis well to learn,
In future practice, it may serve your turn.
Leeches, for instance—pleasing creatures quite,
Try them, and, bless you! don't you think they bite?
You raise a blister for the smallest cause,
And be yourself the great sublime it draws;
And trust my statement, you will not deny,
The worst of draughtsmen is your Spanish fly.
It's mighty easy ordering when you please,
"Infusi Sennæ, caplat concias tres;"
It's mighty different when you quackle down,
Your own three ounces of the liquid brown;
"Pilulæ Pulvis," pleasant words enough,
When "other" jaws receive the shocking stuff;
But oh! what flattery can disguise the groan,
That meets the gulp which sends it through your own.

IN a chemical works in England, where sulphate of copper was manufactured, $3,500 worth of gold was lately taken out by a chemist from a lot of copper sediment which had been thrown aside as worthless. Most of the South American copper ore contains some gold.

THE *Great Eastern* has undergone repairs and is expected to sail for New York on the 1st of April.

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Correspondence

A Kind Word from California.

MESSRS. EDITORS:—We notice with much pleasure the beautiful typographical appearance of your noble scientific journal. We can appreciate such a journal. It speaks in thunder tones for the genius and skill of our working men; those that work with the brains, and those who work with the strong arms of sturdy working men. How proudly does your journal show forth the onward progress of American industry! Amid the roar of cannon aud rattle of musketry, and high o'er all, the din of battle, there is a voice echoing in trumpet tones the triumphs of labor.

Deeply as we feel for the condition of our unhappy country in this calamitous war, we have no doubt of its final glorious results. Lamartine says, "Revolutions are mercenary;" and we must look upon the present one as designed to purge and purify our country of those evils which have been gathering in the body politic like some great and fearful festering sore, its heart and head full of deathly gangrene, and from which our nation could only be relieved by the sad yet needed surgical operation of the patriot's sword, and the purifying influence of a patriot's devotion that demanded a rebaptism of human blood.

Sad, sad as this may be, this seems to be the only alternative, and while our humanity is touched by this needed remedy, we look forward to a speedy convalescence and ultimate recovery of our beloved country from these trials, for all find a great assurance and a confiding faith that a nation that can proffer a treasure of $500,000,000 and 600,000 volunteers to defend its Constitution and its flag, that country can never be cast down or destroyed, and while inspired with all these hopes, we can also look to that almighty energy that is acting upon men under all these discouraging events, and that shine but with such alluring emblems of a nation's wealth, as is shown through the columns of the SCIENTIFIC AMERICAN, whose glad face is welcomed world-wide as one of the greatest evidences that not even the calamity of a war can hinder the onward triumphs of the genius of industry in the American people. Fully sympathizing as we do with love of human progress, we beg to announce to you that with a desire to make known all valuable inventions in every part our country, we tender to the inventors everywhere, on the Atlantic, through you the use of our columns freely to illustrate by plates and engravings their new inventions, and shall be most happy to facilitate them in their enterprises to the utmost in our power, hoping by so doing to bind more closely in fraternal bonds the Atlantic and the Pacific; while we most devoutly pray that God in his good providence may cause the right to prevail in this great and fearful conflict, so that war may cease, and the priceless blessing of a reunion of all our country may soon be heralded over the world, and that we may soon be able to show the world the triumph of our inventions and the proofs of our greatness, and the boundless sources of our wealth, North and South, East and West, by the union of a people whose wealth and strength, and greatness is in and of themselves.

With best wishes for the prosperity of human labor and human progress, I am, truly yours,

COL. WARREN,
Editor *California Farmer*.

San Francisco, Jan., 1862.

Iron-Plating for Ships.

MESSRS. EDITORS:—A regular reader of your paper, my attention has been arrested by your remarks in your issue of the 8th inst., under the heading of "Iron Plating—Is the *Warrior* a Failure?"

The best method of mailing ships of war has become a question of world-wide importance. Thus far there are only three distinctly different methods that have been pursued. The English and French practice hitherto has, we believe, been confined to that of solid iron plates of about four and a half inches in thickness, those upon the *Warrior* being fifteen feet in length and three feet in width, tongued and grooved. Another method proposed is that of successive layers of plates to an equivalent thickness, breaking joints longitudinally and vertically. The last is that of parallel bars placed lengthwise upon the sides of the vessel and secured as indicated by the method which the government has adopted in mailing the vessel recently launched at Mystic River, Conn., and now in the harbor of New York for completion.

Considering that *La Gloire*, the well-known French mailed-steam war vessel, is now in the harbor of Cherbourg undergoing replating, from defect it is said, such as the trial trips of the *Warrior* have demonstrated, and waiving the consideration of other defects of construction, indicated by her "laboring badly in the sea," there is reason to believe that this method of mailing may be regarded substantially as a failure. That solid iron plates will offer greater resistance to the impact of shot and shell than successive layers of plates of the same thickness or even parallel bars, may, as you suggest, be true, but there are objections to their use in other respects, which seem absolutely insuperable. In the case of the *Warrior*, and we believe it is the course pursued with the other vessels of the English and French navies, the plates are placed lengthwise upon the sides of the vessel, tongued and grooved, and forming as close and perfect a joint as possible. Considering the undulatory motion of a vessel at sea, each of these plates may be regarded as a lever fifteen feet in length, the upper and lower corners becoming alternately fulcrums, by this means causing a constant working of the plates upon the sides of the vessel, opening the seams vertically, and producing in the end the inevitable destruction of the vessel. Especially, considering the method of fastening adopted in the case of the *Warrior*, the bolts passing entirely through the hull of the vessel, extensive leakage could not possibly be avoided. While, therefore, as you suggest, "New York and Hoboken" may be safe from the attacks of this redoubtable sea monster, we think it tolerably well demonstrated that solid iron plates for mailing war ships "are a failure." Whether the other methods—both of which have been adopted in the construction, first, of the Ericsson battery, and, second, the Mystic vessel, yet incomplete—will prove to be wholly unobjectionable remains to be seen. That they will not be liable to those that have revealed themselves in the construction of the *Warrior* and *La Gloire*, is quite evident. The method adopted in mailing the vessel built at Mystic seems to combine all the advantages attainable by iron armor. It may be put on of any degree of thickness, the bars being narrow and placed lengthwise on the ship, it may be called the iron-planking method, and, besides avoiding the straining influence upon the sides of the vessel, which solid plates insure, they may be caulked and cemented, as the hull is.

Other advantages will readily suggest themselves in this method, but I intended no general discussion of this subject, but merely to draw attention to the distinctions between solid iron plates and other methods for mailing. W. L. B.

Washington, D. C., March, 1862.

The Motion of Rockets.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of March 1st, in answer to my remarks of Feb. 8th, Mr. Potts repeats, in substance, his opinion that the cause of motion is by the resistance of air to the issuing gas, and that in a vacuum "it is doubtful if there would be any motion."

I had exhibited the opposite opinion, by supposing a cylinder containing steam, or other gas, surrounded by air compressed to the same density, when no motion, or tendency thereto, would exist, but by relieving the density of the air, the contained gas would become available for motion, in proportion to the tenuity (misprinted density) of the air, and that in a vacuum the action would be perfect.

Mr. Potts now states my view would be correct for the initial impulse, but would not hold good any further, and presents the following illustration as proof of the correctness of his opinion, viz.:—The safety-valve pipe to a boiler containing steam is supposed to be suddenly relieved of its weight and exposed to a vacuum, when there would not only be no additional pressure of reaction, but a more rapid exhaustion of the steam.

The relavency of this example is not perceived unless it suppose the exit end alone of my cylinder be thus exposed to a vacuum, entailing a freer issue of gas, without increasing the propelling reaction, which is similar in principle to the one-sided result of the "bow and book" experiment.

The cylinder, however, has two ends, and the question requires them both to be under the influence, and in that case, whether the surrounding be dense, rare or void, the escape of the gas is the measure of the motion. T. W. B.

Cincinnati, March 5, 1862.

Suggestion to Photographers.

MESSRS. EDITORS:—A radical defect in nearly all liknesses taken by the new method now in use, arises from the fact that the sitter being in a novel situation unconsciously assumes a constrained and unnatural expression of countenance, and having no means of correcting this, it is of course repeated in the picture. Hence, so few are entirely satisfied with their photographs. The improvement we suggest, is designed to obviate this defect, by attaching to the camera an ordinary plane mirror, so adjusted that the sitter, instead of staring into blank space with a feeling of what a ridiculous part he is playing, shall look at his own reflection in this glass during the entire operation. He will thus be enabled at once to assume and retain his ordinary expression of countenance, or take any other that best pleases himself. The picture will be an exact reproduction of the image in the mirror, and cannot fail of being perfect in every respect. EDWARD L. PORTER.

New York, March 4, 1862.

Infringement Previous to Re-issue.

MESSRS. EDITORS:—You will oblige me by answering the following question:—If A takes out a patent and B and others infringe the provisions of said patent, and, subsequent to said infringement, A surrenders said patent, not for any defect that would render it void at law, and a new patent is granted, can A recover of B for a violation of the old or surrendered patent; or, in other words, does the surrender and re-issue of a patent release all that infringed the provisions of the original patent? I. C.

Eaton, N. Y., March 1, 1862.

[The surrender of a patent for the purpose of obtaining a re-issue for any cause, invalidates all claims for infringements before the surrender; under such circumstances the patentee having abandoned his original patent has nothing upon which to found his claims against infitngers. His right to sue for an infringement of his rights takes date from the re-issue of his Letters Patent.—EDS.

Questions for Millers.

MESSRS. EDITORS:—I should like to see the following questions answered by some experienced miller through the columns of the SCIENTIFIC AMERICAN:—A burr millstone, 3 feet 10 inches in diameter and of medium quality, as regards pores or openness, as termed by millers, making 135 revolutions per minute, what amount of draft should the furrows have, and what should be the number of furrows, what their shape, &c., to suit 16 feet length of bolting reel 30 inches in diameter, one half No. 9 cloth, balance No. 10? How much ought such to bolt per hour, ordinary grist flour? Is a circular as good as a straight furrow? Should said stone be faced to the eye? As their is so much difference of opinion among millers in regard to the amount of flouring face, I would like to hear views of millers on the subject.

A YOUNG MILLER.

SCOTTISH IRON TRADE.—In 1861 there were 1,050,000 tuns of pig iron manufactured in Scotland, by 123 furnaces. The number of tuns shipped to the United States, was 54,482, against 77,632 in 1860. The local consumption in Scotland is 364,000 tuns per annum: all the rest is exported. Germany takes no less than 94,000 tuns annually of this peculiar pig iron, and France, 62,000. Glasgow, on the river Clyde, is the greatest place for building iron steamships in the world. In 1861, there were 86 steamers finished, and there are now 34 new vessels on the stocks.

CEMENT FOR WOOD AND GLASS.—Dissolve common glue in a carpenter's glue pot, and add to it finely sifted wood ashes, until it becomes somewhat thicker but still pasty. Apply it while hot, and press the edges of the glued article firmly together. This cement is said to be very adhesive for wood.

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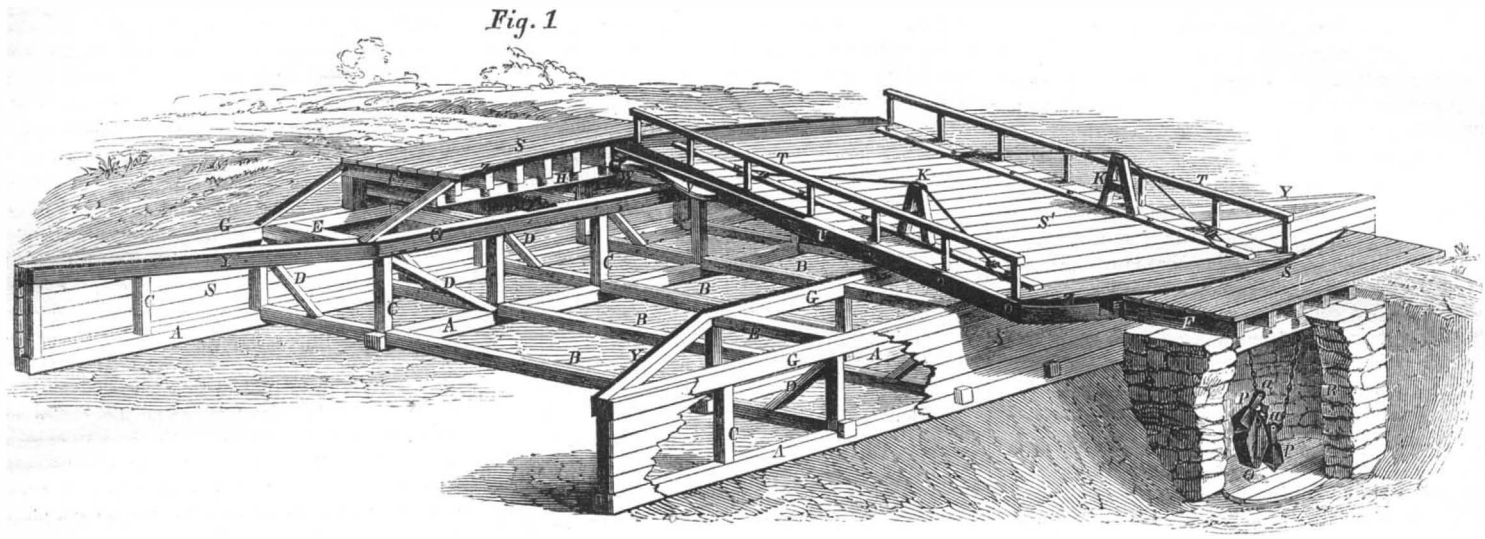
Self-Acting Drawbridge for Canals, &c.

Canal bridges, as heretofore built, are fixed structures, and are usually elevated at such a hight above the canal that boats can freely pass under them. This class of bridges necessitates the building of an inclined elevated roadway for each. The reason why such bridges have heretofore been exclusively used on canals in preference to flat drawbridges, which do not require an inclined roadway, is probably owing to their costing so much for their practical working, as each requires to be opened and closed by an attendant.

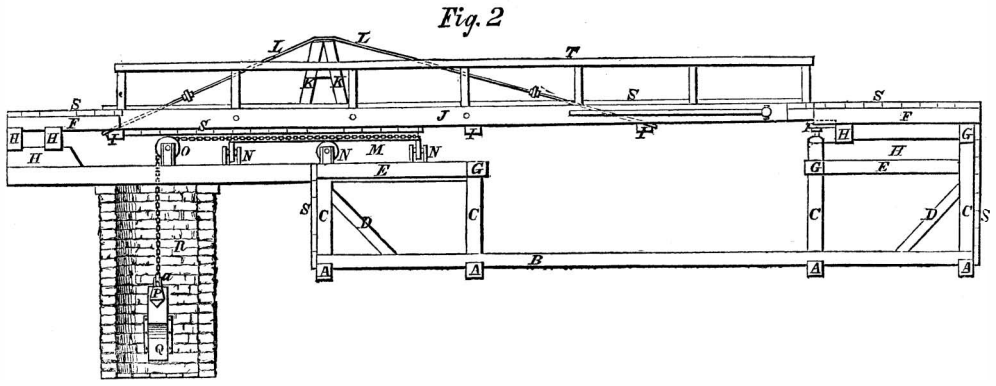
Fig. 1



SCHNEIDER AND MONTGOMERY'S SELF-ACTING DRAWBRIDGE FOR CANALS, ETC.

The accompanying engravings represent a self-acting drawbridge which is opened by the boat pressing against it while passing through the canal and which closes itself after the boat has passed. No attendant is therefore required for it. Fig. 1 is a perspective view of the bridge with its swing draw partially open. Fig. 2 is a side elevation showing the wheel, chain and rollers on the under side of the swing platform, and Fig. 3 is a section top view, showing the adaptation of the bridge to a double channel, in which case it swings on a central pier. Similar letters indicate like parts on all the figures. The figures will be more readily understood by bearing in mind that this is a swing bridge, and that the roadway oscillates on a vertical axis, and it has its wheel table supported on friction rollers so that it may be very easily turned.

Fig. 2

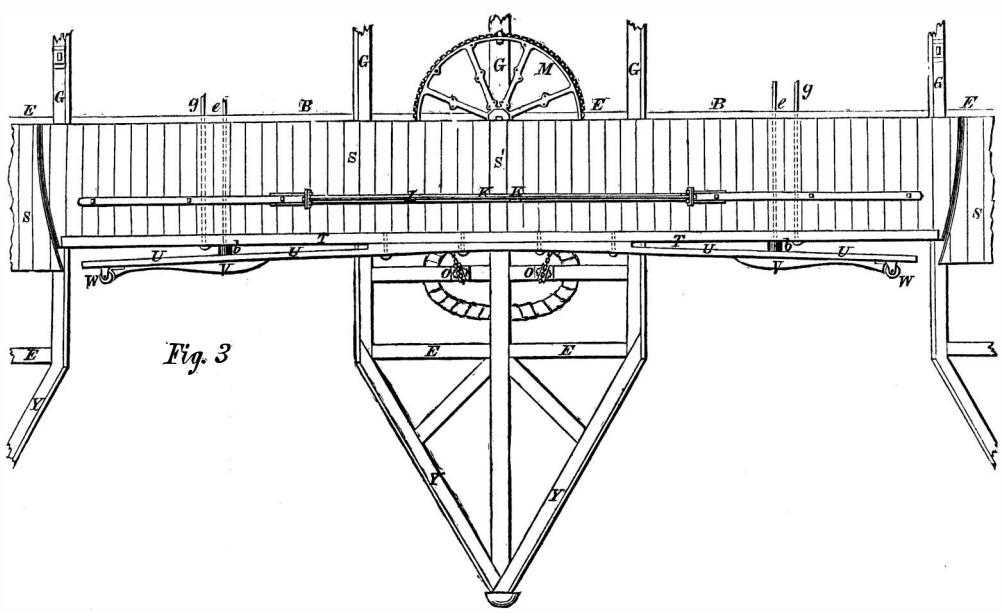


A B represent the mud sills of the bridge; they are placed under ground in the bottom of the canal, but are shown in the figure so that the entire construction may be more clearly explained. C are the posts supporting the side frame work; D are braces; E are cross timbers of side work and are level with the water; Y are the guides to the channel way; F are timbers supporting the planking of the roadway at the end of the bridge; G are string pieces on a level with the water. H are timbers to raise the cross timbers, E, to the proper hight; I are cross timbers under the bridge; J are string pieces of the bridge; K is the gallows frame secured to the bridge over which the bracing bolts, L, pass; M is a large wheel secured to the under side of the bridge, and resting on friction rollers, N, on which it and also the bridge revolve. The wheel, M, is a large pulley with a groove in its periphery to receive the chain shown, which is made fast at the forward side and is drawn around it, then passes over the pulleys, O O, and down into the pit, R, as shown in Fig. 2.

The chain is secured to the hollow weight, Q, and is made in two parts for the purpose of enabling it to be properly loaded. On either side of the large weight, Q, is a smaller one, P, with a pulley, *a*, secured to its upper end, and through which the chain passes freely. The balance weights, P, are for taking up the slack of the chain when the bridge is turned in either direction.

S represents planking, and S′ is a loose plank on the roadway to enable a person to reach the center and friction rollers under the bridge to lubricate them; T is the railing.

Fig. 3



A buffer is secured on each side at the lower part of the railing of the swing roadway; U is the springs of the buffer made of plank and stiffened behind with india rubber or other springs, *b b*. V is a bumper fastened to the plank springs, U U. It has a roller, W, in front of its forward end as is more clearly shown in Fig. 3. A boat in passing through the canal at its usual speed presses against the bumper, V, and plank spring, U; and before the tension of the spring is taken up, the bridge starts from its position, and commences to turn. As the boat advances, the rollers, W, press against its sides, thus allowing it to pass through without breaking and wearing the swing. The center screw and step below the turn-table wheel, M, can be raised or lowered as may be found necessary. By reference to Fig. 1 it will be noticed that when a boat is passing through the canal and is moving the swing roadway, one side of the chain is drawn up on the wheel, M, also the weight, O, leaving one of the small weights, P, to take up the slack and keep the chain taut around the periphery of the wheel. As soon as the boat has passed through the large weight will draw down the chain, and thus turn the wheel, M, bringing the bridge in a line with the roadway and the forward end of the bridge resting on the rollers, W, and the roadway is then open for carriages and passengers to cross. Such bridges are also well adapted for all navigable streams where the water is uniform in depth.

In cities, towns and villages through which canals pass, the bridges in general are few in number and are ugly elevated structures, and all the general traffic is directed through the streets in which they are erected. Such a bridge as the one represented may be economically applied for every street that crosses a canal, and thus afford superior facilities for public communication.

One of these bridges has been put up on the West Branch of the Susquehanna canal at Williamsport, Pa., and the President, Directors and Superintendent of the Canal Company certify that it was in operation all the boating season of 1861, and "that it is on a level with the street, and only about two feet above the water in the canal; that it is readily opened by a boat passing, and always closes itself; that it has been severely tested by the passage of heavily loaded wagons, and appears as permanent and durable as the ordinary bridge. Boatmen do not object to the bridge as any obstruction." Patented Sept. 4, 1860.

For further information address Louis Schneider, the assignee of the invention, Williamsport, Pa.

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THE FIGHT BETWEEN THE "MERRIMAC" AND "MONITOR."

On Saturday, the 8th of March, the large iron-plated rebel steamer *Merrimac* steamed slowly out of the harbor of Norfolk, and proceeded to Newport News at the mouth of the James river, where some of the old wooden sailing ships of our navy were stationed for the purpose of blockading the river. As she approached, the *Cumberland* a 24-gun sloop-of-war of of 1,725 tuns, began to fire upon her at long range, but the shot glanced from her inclined iron sides like billiard balls from a cushion. The *Merrimac* held on her course till she came very near the *Cumberland*, when she fired a broadside of her four 11-inch guns, and then drove with full force against the wooden side of the sloop, piercing it with her sharp iron prow, and making a vast rent, through which the water poured in torrents into the helpless vessel. Drawing off and firing another broadside, she came again, this time against the waist of the sloop, and making another fearful chasm in her side.

The *Cumberland* soon went down, carrying a considerable portion of her crew, her flag flying at her mast to the last, and it continued to fly when the keel was resting on the bottom 54 feet beneath the surface of the water. After destroying the *Cumberland* the *Merrimac* turned her attention to the *Congress*, an old 50-gun frigate of 1,867 tuns. The commander of the *Congress* soon saw that his craft was utterly helpless against the destructive shot and shell of the *Merrimac*, and he was reduced to that bitterest necessity that ever occurs in the life of a soldier, the pulling down of his flag.

Most opportunely, in the course of the evening, Ericsson's iron-plated steam battery, the *Monitor*, arrived in Hampton Roads. She immediately proceeded to the protection of the stranded *Minnesota*, which, it was not doubted, the *Merrimac* would attack in the morning. In the clear and beautiful Sunday morning of March 9th, the *Merrimac* again proceeded to her work of destruction ; but the arrival of the little *Monitor*, with her two 11-inch guns, had materially changed the relative condition of the combatants. At about 8 o'clock the *Merrimac* made her appearance, steaming toward the *Minnesota*, apparently without observing the little lion that lay in her path. When she arrived within about a mile, the *Monitor* fired one of her guns, the shot striking the *Merrimac*, but glancing harmless from her inclined plates. The *Merrimac* slackened her speed, but continued to approach. When she arrived within a quarter of a mile of the *Monitor* both iron-clad vessels began to cannonade each other with all their might ; still drawing more nearly together. This novel naval duel was witnessed by thousands who crowded the vessels and lined the docks in the vicinity. The vessels finally approached each other so closely that they were both covered by the same dense cloud of smoke.

The *Monitor* sailed round and round her antagonist, seeking some vulnerable spot, and, it is said, succeeded in driving a shot through the sides of the *Merrimac*, below the iron plates. At all events the *Merrimac* drew off to Craney Island, where she was soon surrounded by the rebel gunboats.

This is the first conflict that has ever taken place between iron-plated ships, and it was certainly one of the most exciting that is recorded in the annals of naval warfare.

We have received the following letter from Mr. Keeler, Assistant Paymaster, which describes the effects of the shot on the *Monitor* :—

U. S. Steamer "Monitor,"
Hampton Roads, March 11, 1862.

Messrs. Editors :—As it may be some time before the official report of Chief Engineer Stimers is made public, I have thought that the effects of the shot on our vessel in the late engagement with the *Merrimac* might be interesting to you. The details of the fight, which lasted three hours and a half, have already been made public, so that I will confine myself to the effect of the shot upon us.

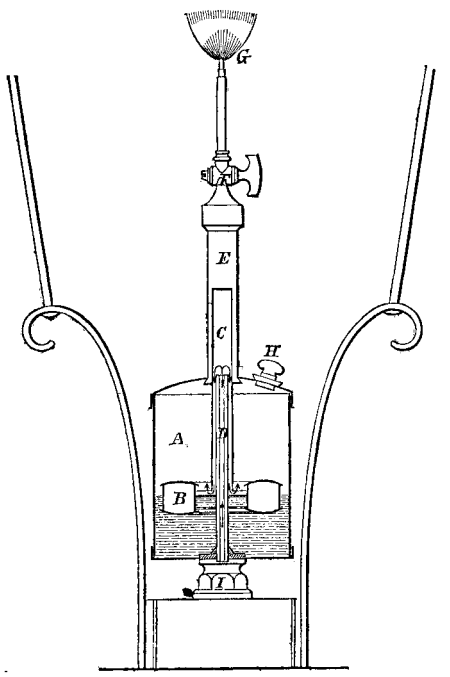
The *Merrimac's* projectiles were mostly percussion shells, fired from ten or eleven-inch rifled pieces. Twenty-three shot struck us, including two from the *Minnesota*, which, during the engagement, fired over our heads. The deepest indentation on our turret was two and one half inches, produced by a 150-lb. percussion shell fired at a distance of twenty feet perpendicular with the side. Our deck received four shot making slight depressions. One shot struck us on the angle formed by the deck and side, tearing up the iron plating about one-third the width of a sheet, starting the bolts and splintering the wood a little. Three or four others struck us just above the water line, with no other effect than making indentations of two inches. The pilot house received one shot on one of the upper corners, nearly battering it down. A little later in the action, however, a heavy shell was thrown from a distance of about fifteen feet, against the front, at an angle of about thirty degrees, striking the two upper bars just at the lookout crack, the main force being on the lower of the two, forcing it in about an inch, and opening a crack of one-fourth of an inch on the opposite side. She twice attempted to open a hole in our side with her ram, as she did the *Cumberland*, once striking us squarely on our beam, nearly abreast of the turret, jarring us somewhat, and leaving a small dent on our iron side. Our hull remains perfectly tight, and the turret, notwithstanding the severe hammering, revolves as accurately and easily as when we left New York.

We experienced a severe gale on our way down, coming through it safely. That, and our trial with the *Merrimac* proves the *Monitor*, we think, a success.

W. F. Keeler,
A. A. Paymaster.

CARBURETING APPARATUS FOR STREET LAMPS.

Many years ago it was discovered that the common gas employed in street and other lamps, when brought into contact with naphtha, absorbed some of this hydro-carbon liquid and became more luminous. Various attempts have been made to naphthalize gas for public illumination, but hitherto they have all failed of practical success. The accompanying engraving, which is a section view, represents Mr. Shepard's patent naphthalizing apparatus which has lately been applied to street lamps, as described in the *Journal of Gas Lighting*, London, and which is stated to be an improvement of considerable importance.



Each burner may be provided with its own carburator situated near the burner, or at some distance, as may be most convenient ; or several burners may be provided with one carburator. A float composed of cork, wood, tin, or other suitable material is employed ; this float is placed on the surface of the liquid, and it supports an upright tube which is closed at the top ; into this tube the gas is admitted by the supply-pipe passing up the interior of the tube whereby the current of gas, before passing to the burner, is made to play on the surface of the naphtha, and is rendered uniform at whatever level the surface of the carbureting liquid may be. Where the carbureting liquid is poured into the vessel, a piece of fine wire gauze should be inserted directly under the mouth or hole where the liquid is poured in, and a piece should also be placed inside the tube which conducts the gas to the burner.

A is a reservoir or vessel for holding the naphtha or carbureting liquid ; B is the float, and C the tube supported thereby. This tube is closed as its upper end ; the gas is consequently caused to descend down and to strike against the surface of the naphtha or carbureting liquid. The gas escapes through wire gauze attached to the lower end of the tube, C ; D is the gas supply-pipe by which the gas is conducted up the tube, C ; E is the upper gas pipe, through which the gas and vapor rise to the burner ; F is the stop-cock between the burner and the vessel, A ; G is the burner. H is the hole or mouth for introducing the carbureting liquid into the reservoir, A ; the same is closed with a screw plug, and just under the hole, H, inside, is put a piece of wire gauze. I is the junction of the gas supply pipe, D, with the gas pipe interior of the post. In the above description, only one gas burner is mentioned as applied to a street lamp, and the carbureting apparatus is placed very near thereto ; but it will be evident that similar apparatus may be employed for carbureting gas for several burners, and the carbureting apparatus, whether for one or several burners, may, when desired, be placed at a greater distance from the burner or burners. It is, however, desirable that the carbureting apparatus should be as near as may be to the burner or burners, in order to prevent any condensation of the carbureting vapor. This subject is now exciting a great deal of public attention in London.

Manufacture of Iron and Steel by Electricity.

Mr. A. L. Fleury, of Philadelphia, is now engaged at the Pennsylvania Iron Works, Danville, Pa., in testing his new method of applying induced electricity in the manufacture of iron, which has before been noticed in the Scientific American. His apparatus for producing the required quantity of electricity for so great a mass of metal proved insufficient, and it became necessary to procure a larger one. For that purpose he went to Binghamton, N. Y., where he procured a powerful magneto-electric machine from Hon. John A. Collier, President of the magneto-electric Company of New York, with which he is now about to make the interesting experiment at the furnaces of the above company. These machines are used for electrotyping, for producing the most intense electric light, which penetrates through fogs, and can be used also for submarine purposes ; for the successful decomposition of water, the production of hydrogen and oxygen, for the smelting of all kinds of ores, for the manufacture of iron and steel, and numerous other purposes. These machines, driven by steam power, are of very simple construction, devoid of complexity, and not liable to wear and derangement.

The employment of electricity in the manufacture of iron is one of great interest, and the result of these experiments will be anxiously looked for.

Plating Porcelain and Platinum.

We translate the following article, by Dr. Elsner, from *L'Invention* :—

Triturate platinum black, prepared by any of the known processes, with the essence of turpentine, and apply the mixture with a pencil on the piece of porcelain to be plated, cold. Inclose the piece in a sagger and expose it to the strongest heat of a porcelain furnace. After cooling it will be found covered with a thick plate of brilliant platinum. The platinum black, which is simply platinum in the state of a very fine powder, when exposed to the strongest fire of a porcelain furnace, forms a metallic mass which under the microscope exhibits rounded angles closely resembling native platinum. Vases lined with platinum by this method may be employed in chemical operations and in the arts in place of platinum vessels. One of the best means of preparing platinum black is that of Professor Bottger, which consists in precipitating the chloride of platinum by boiling it a few minutes with a little gluecose and carbonate of soda, and then washing the precipitate on a filter and drying it at the ordinary temperature.

Cotton in England.—By the latest arrivals from England we learn that the prices of cotton have advanced in Liverpool, and the market is buoyant. Fair Orleans was selling at 14½ pence (28 cents) per lb., and Middling Uplands at 12⅝ pence. No less than 80,000 bales were sold during the week preceding the 21st of February.

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ANNUAL REPORT
OF THE
COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE, January 31, 1862.

SIR:—In conformity with the requirements of the 14th section of the act of March 3, 1837, entitled "An act in addition to the act to promote the progress of science and useful arts," I most respectfully submit the following report:—

In the section of the act above referred to it is declared to be the duty of the Commissioner of Patents "to lay before Congress, in the month of January, annually, a detailed statement of the expenditures and payments by him made from said (patent) fund. And it shall also be his duty to lay before Congress, in the month of January, annually, a list of all patents which shall have been granted during the preceding year, designated under proper heads, the subjects of such patents, and furnishing an alphabetical list of the patentees, with their places of residence; and he shall also furnish a list of all patents which shall have become public property during the same period, together with such other information of the state and condition of the Patent Office as may be useful to Congress or to the public."

The first provision of the above instructions to the Commissioner requires "a detailed statement of the expenditures and payments by him made." For a more complete and intelligible exposition of the affairs of the office, I beg leave to submit the following statement:—

No. 1.

Number of applications received during the year	4,643
Number of patents granted, including designs, re-issues and additional improvements	3,340
Number of caveats filed	700
Number of applications for extension of patents	16
Number of patents extended	21
Number of patents expired December 31, 1861	546

No. 2.

STATEMENT OF MONEYS RECEIVED DURING THE YEAR.

On applications for patents, re-issues, designs, additional improvements, extensions, caveats, disclaimers and appeals	$125,601 00
For copies and for recording assignments	11,753 44
Total	$137,354 44

No. 3.

STATEMENT OF EXPENDITURES FROM THE PATENT FUND DURING THE YEAR.

For salaries	$92,868 92
For contingent expenses	59,502 36
For temporary clerks	43,791 31
For withdrawals	23,173 32
For refunding money paid by mistake	1,306 00
For judges in appeal cases	850 00
Total	$221,491 91

No. 4.

STATEMENT OF THE CONDITION OF THE PATENT FUND.

Amount to credit of patent fund on January 1, 1861	$89,554 07
Amount paid in during the year	137,354 44
Total	$226,908 51
From which deduct expenditures during the year	221,491 91
Which leaves to the credit of the patent fund Jan. 1, 1862	$5,416 60

No. 5.

QUARTERLY STATEMENT OF EXPENDITURES FOR 1861.

First quarter	$61,050 23
Second quarter	62,439 25
Third quarter	52,104 58
Fourth quarter	45,897 85
Total expenditure	$221,491 91

No. 6.

TABLE EXHIBITING THE BUSINESS OF THE OFFICE FOR TWENTY-FIVE YEARS, ENDING DECEMBER 31, 1861.

Years.	*Applications filed.*	*Caveats filed.*	*Patents issued.*	*Cash received.*	*Cash expended.*
1837	....	....	435	$29,289 08	$33,506 98
1838	....	....	520	42,123 54	37,402 10
1839	....	....	425	37,260 00	34,543 51
1840	765	228	473	38,056 51	39,020 67
1841	847	312	495	40,413 01	52,666 87
1842	761	291	517	36,505 68	31,241 48
1843	819	315	531	35,315 81	30,766 96
1844	1,045	380	502	42,509 26	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,531	553	572	63,111 19	41,878 35
1848	1,628	607	660	67,576 69	58,905 84
1849	1,955	595	1,070	80,752 78	77,716 44
1850	2,193	602	995	86,927 05	80,100 95
1851	2,258	760	869	95,738 61	86,916 93
1852	2,639	996	1,020	112,056 34	95,916 91
1853	2,673	901	958	121,527 45	132,869 83
1854	3,324	868	1,902	163,789 84	167,146 32
1855	4,435	906	2,024	216,459 35	179 540 33
1856	4,960	1,024	2,502	192,5 8 02	199,931 02
1857	4,771	1,010	2,910	196,132 01	211,582 09
1858	5,364	943	3,710	203,716 16	193,193 74
1859	6,225	1,097	4,538	245,942 15	210,278 41
1860	7,653	1,084	4,819	256,352 59	252,820 80
1861	4,643	700	3,340	137,354 44	221,491 91

While the aggregate receipts of the office have been but $137,354 44, the expenditures have amounted to $221,491 91.

By the act of March 2, 1861, the expenses of the office were largely increased, as follows:—

Salaries of examiners in chief	$6,437 53
Salaries of commissioner and chief clerk	1,500 00
Printing	17,854 37
Total	$25,791 90

The receipts of the past year have fallen $118,998 15 below those of the previous year; and the expenditures, omitting the above $25,791 90 as extra, have been $51,220 79 less than those of 1860. The cause of this great falling off of receipts must be apparent to every reader. The great inventive mind of the country has been attracted in another direction by the startling scenes of rebellion which have transpired. A state of civil war has deprived this office of the patronage of most of the slave-holding States; the enterprise of the loyal States has, to a great degree, been paralyzed, and the sale of patent rights, as an article of traffic, has, in a great measure, been abandoned.

To provide for this state of affairs I have been compelled to resort to a most rigid economy. To bring the expenditures as nearly as possible within the ability of the office to meet them, by way of retrenchment I dismissed five principal examiners, five assistant examiners, and five second-assistant examiners. The compensation fixed by law of the principal examiners is $2,500; the assistants, $1,800; the second assistants, $1,600. The business required that seven of each of these classes should be retained; but a still further reduction of expenditure being necessary, I dismissed the principal examiners and appointed them assistant examiners, and they are now receiving but $1,800 per year; the assistant examiners were dismissed and appointed second-assistant examiners, at a salary of $1,600; the second assistants were dismissed and appointed clerks, at an annual salary of $1,400. These officers, however, have all been performing the duties pertaining to their original positions. A large reduction was also made in the salaries of the clerks. The temporary clerks, who formerly received ten cents per hundred words for copying are now paid but eight cents. This was regarded as a legitimate reduction, as the office receives for such work, by law, the same compensation formerly paid the clerks, while the expense of superintending clerks, stationary, &c., exceeded $5,000 per annum. A large number of laborers, watchmen and attendants have been dismissed, and their places are now vacant. The reduction of the salaries of the examiners and clerks has been very onerous to them. The expenses of living in this city are largely increased by the centring here of a large army, and the attraction of thousands of civilians, who largely consume the necessaries of life, which, at all times, are less abundant here than in many other portions of the country. The military necessity, which required the closing of the communication between the farmers of Virginia, from whom a greater part of the usual supplies come, and the market of this city has contributed much to the expense of living in Washington. For these reasons I respectfully submit to Congress the justice and propriety of conferring upon the Commissioner of Patents authority to refund the difference in the salaries of the examiners and clerks, between the amount allowed by law and that now received by them, whenever, in his opinion, the funds of the office will justify it.

The 14th section of the act approved March 2, 1861, provides "that the Commissioner of Patents be, and is hereby authorized to print, or, in his discretion, to cause to be printed, ten copies of the description and claims of all patents which may hereafter be granted, and ten copies of all drawings of the same, when drawings shall accompany the patents; provided, the cost of printing the text of said descriptions and claims shall not exceed, exclusive of stationary, the sum of two cents per hundred words for each of said copies, and the cost of the drawing shall not exceed fifty cents per copy; one copy of the above number shall be printed on parchment, to be affixed to the Letters Patent; the work shall be under the direction, and subject to the approval, of the Commissioner of Patents, and the expense of the said copies shall be paid for out of the patent fund.

In accordance with this provision of the law, and with the approval of the Secretary of the Interior, I contracted with a responsible party for the execution of the work. The issues from the 2d of March to the 1st of November, 1861, were printed in a superior style, and the drawing executed in the most satisfactory manner by the photographic art.

This feature of the law has given eminent satisfaction to the inventors of this country, and has commanded the admiration of inventors and the superintendents of patent departments in many other countries. The imperative necessity which required it to be suspended was and is greatly to be deplored; but I earnestly hope that Congress will take the necessary steps to resume it at as early a day as practicable.

The importance of furnishing to the public the most complete practicable information in relation to every patented invention is obvious. Each patent as the name implies, should be open to to the perusal of all, and as it has the effect of a law should be published at the public expense, as all other laws. The people of the country should have full information as to all patented inventions, firstly, that by a knowledge of the full extent of the exclusive privilege claimed by the holder of a patent they may not be exposed to damages for infringing upon it; secondly, that they may not be induced to believe that the holder of a patent has exclusive privilege for more than is described and claimed in his specification; thirdly, that they may be informed as to the actual progress of the useful arts and avail themselves of the most useful inventions; and fourthly, that the whole inventive genius of the country may be stimulated by the examples and suggestions furnished by descriptions and representations of each year's inventions.

Congress has evinced its appreciation of the importance of furnishing such information by the large appropriations which it has heretofore authorized for the publication of the mechanical reports of this office. I have been furnished by the Superintendent of Public Printing with a statement of the cost of printing, paper, binding, &c., of the mechanical reports of this office for each of the last three years, which is as follows:—

1858, 3 volumes, 32,950 copies, cost	$85,659 08
1859, 2 volumes, 68,550 copies, cost	138,700,32
1860, 2 volumes, 66,550 copies, cost	118,992,09

These reports contain merely brief abstracts of the specifications made originally by examiners in the office, and latterly furnished by individuals out of the office by contract, and consequently prepared with the least possible expenditure of labor and expense, with the claims generally unintelligible, without the full description contained in the specifications. Meager and unsatisfactory as these abstracts are, the reports have been most eagerly sought for by the public. The publication of these reports will, I think, prove to have been most wisely suspended, if the substitute can be provided which was intended to be secured by the late law.

In making provision for this great public want Congress should not be unmindful of the examples of other nations most advanced in the mechanical arts. In Great Britain France, Sardinia and Belgium, the specifications are published in full, and in such a form that printed copies may be furnished to all who may apply for them at cost price, while the entire publications are extensively distributed for the free use of the public. In Prussia, Saxony and Bavaria, official journals are published containing full abstracts and lists of the specifications of patents. The publications of specifications made by the French government consist of 91 volumes, quarto, of the old law, and 35 volumes, quarto, of the law of 1844. All which have been presented to the library of this office.

In Great Britain the publications of the specification and drawings of patents has been made upon a scale of magnificence which entitles it to be regarded as one of her great national works. The great seal patent office has published the complete specifications and drawings of patents granted by that office since 1623, in two series, the old law series from 1623 to 1852, and the new series from October 1852 to the present time. The old law series, comprising 12,977 patents in number, are contained in about 900 volumes, 450 folio volumes of drawings, and the like number of imperial octavo volumes of letter-press. The indices form seven imperial octavo volumes. The cost of these works in 1859 amounted to £92,000. The expense of printing for 1859 was estimated by the Commissioner of Patents at £17,500.

The publications of the great seal office consist of the specifications and drawings of patents granted, (the drawings are not photographic,) a subject-matter index of patents, an alphabetical index of patentees, a chronological index of patents, commissioners' of patents journals, (published semi-weekly,) assignments of specifications of various classes of patents, of which twenty volumes have been published, and all are in course of publication.

The publications are distributed among one hundred and seven libraries and offices in Great Britain, twenty-six libraries in the British colonies, and twenty-two in foreign countries. Of these last, six are in the United States; the cost of which has been upwards of £10,000. The cost of the continuation is at least £1,500 weekly. For these costly works our government has been able to make no return except the meager abstracts heretofore published by us.

No attempt has been made in the publications ordered by me, under the provisions of the late law, to imitate the costly works published by the great seal office; but the publications, though not wanting in taste and finish, are believed to be of equal practical value. Many advantages have already been presented by a brief trial of this system in this office, among which may be mentioned the readiness of inventors to furnish more artistic and detailed drawings, at a greatly increased expense, with the view of exhibiting these inventions to the best advantage; a change which would greatly facilitate the examinations of the office as well as aid inventors in making inquiries as to the patentability of their inventions. Through the improvement in the drawings, thus effected, and by the adoption of the photographic system of illustration, it is believed that the publications, if continued, would surpass in practical value those of Great Britain.

The depressed condition of the financial affairs of this office, incident to the state of the country, has alone induced me to abandon the wise provision of Congress, requiring the printing in full of the specifications and drawings of the patents issued from this office. From a careful examination of the matter, I am induced to believe that if Congress were to appropriate a sum sufficient to defray the expense heretofore incurred in the printing of the specifications and drawings of the patents, and which will not exceed one-half the sum heretofore expended from the general fund of the government, the office will be able hereafter to meet the expense thus to be incurred. This will enable those who desire copies to secure them at a small cost comparatively with what they now have to pay for manuscript copies. I am induced to believe that an appropriation of fifty thousand dollars for the present year would enable the office to carry out this most salutary provision of the law of the last Congress. An abandonment of the publication of the mechanical reports, rendered unnecessary by the printing of the specifications and drawings, under the law of March 2d, 1861, would save to the government, after making the appropriation above requested, the sum of $

The restoration to the Patent Office fund of the amount withdrawn from it in conformity with the provision of the law of March 2, 1861, would be an act of simple justice to the inventors of the country, by whom this fund has been contributed. It would seem to be inequitable for them to bear the expense of introducing a new system of publication, the benefits of which are not for themselves but the general public. It is believed that this charge would not have been imposed by Congress upon the patent fund, if the diminution of then existing surplus fund, in consequence of the financial difficulties of the country, had been anticipated. The inventors have already been heavily taxed for the erection of the Patent Office building. There has been contributed by the patent fund for this purpose:

By act of July 4, 1836	$108,000
By act of March 3, 1849	50,000
By act of May 15, 1850	90,000
By act of September 30, 1850, appropriating $110,000, if so much remained in the patent fund	71,000
Making the whole amount contributed	319,000

The appropriation of this fund is justified only by the consideration that the inventors derive the most immediate benefit from the use of the Patent Office building. It cannot be doubted that the whole patent fund should be preserved for the use of those who contributed it, and certainly that the efficiency of the office for whose support this fund is primarily intended should not be impaired by the diversion of any part of it for secondary purposes. Congress has heretofore recognized the propriety of reimbursing the patent fund for all sums withdrawn for the benefit of the general public. Appropriations had from year to year been made of sums to be paid out of the patent fund for the collection of agricultural statistics and the purchase of seeds. By the act of March 3, 1855, the sum of forty thousand and seventy-eight dollars and seventy-eight cents was appropriated by Congress, to be paid out of any money in the treasury not otherwise appropriated, for the reimbursement to the patent fund of the whole amount thus withdrawn from the fund for the purposes above mentioned.

It is important to be observed that it is indispensable

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that the printing of these publications should be done under the immediate supervision and control of the office The specifications and drawings should not be removed from the office, as they are in constant demand for reference, and the inventors demand that there should not be a day's delay in issuing the patents after their date, which will be always liable to happen if the work should be done with other public printing. The type should be set up within the office, directly from the specifications. By doing this the cost of copy for the printer and the cost of recording the specifications will be saved, both of which are necessary when the setting of the type is done out of the office. The saving in these two items are the most important elements of the practicability of continuing the printing at the expense of the office.

As these publications, if continued, will be intended to supply the place of the former Patent Office Reports, and the gratuitous distribution to individuals will, of course, be dispensed with, some provision should be made to place them before the public. A sufficient number might be purchased by Congress at the same rate that may be charged to individuals, to place them in the most important libraries in each State, and to make exchanges demanded by national courtesy with foreign governments. A thousand copies, it is believed, will be sufficient to communicate the information as to the inventions of this office as effectually as has been done by the gratuitous distribution to individuals of the former reports.

PROPOSED AMENDMENTS.

By the law of March 2, 1861, it is provided that on filing each original application for a patent, except for a design, fifteen dollars shall be paid, and on issuing each original patent, twenty dollars. Practically, this postponement of the payment of the final fee operates disadvantageously to the office. The evidence of the truth of this statement is found in the fact that more than four hundred patents which have been ordered to be issued are now in the office awaiting the payment of the twenty dollars. Thus the office is deprived of more than eight thousand dollars, for which it rendered its time and labor. If this provision should remain as it now is the number will largely increase, and, of course, will prove a great loss to the fund, and may prove the source of endless litigation. It may be further observed that, until the additional fees are paid on these applications, each operates as a caveat which may be perpetual without the yearly renewal and fee required in other cases for perpetuating caveats, the public deriving no benefit from the publication of the patent, and other inventors being excluded from obtaining patents for the inventions. I would respectfully suggest that the law be amended, either by restoring the former provision, that the whole fee be paid on making the application, twenty dollars to be repaid to the applicant when the application is finally rejected and withdrawn; or that the application fee, intended to cover the expense of examination, should be increased to twenty-five dollars, and that ten dollars should be required on the issuing of the patent.

The avowed object of the second section of the act of the 2d of March, 1861, is "securing greater uniformity of action in the grant and refusal of Letters Patent." This is attempted to be effected by the creation of three examiners-in-chief, whose duty it is made to "revise and determine upon the validity of decisions made by examiners when adverse to the grant of Letters Patent, and in interference cases." It was expected by this means to relieve the Commissioner of a portion of the labor of the duties of office imposed upon him, but it has utterly failed to secure this last-named object.

As now constituted under the law, the examiners-in-chief form a tribunal independent of the Commissioner in all cases of rejection or interference decided by the examiner. An appeal lies from the examiner to them, from them to the Commissioner, and from him to one of the judges of the Circuit Court of the District of Columbia.

The chief justice has decided that an appellant must go through each tribunal before the judge of the Circuit Court can take jurisdiction of his case.

This state of the law and practice is far from beneficial to the public, and does not tend to secure greater uniformity of action in the grant or refusal of Letters Patent, and does certainly greatly augment the labor of the Commissioner. The act, in my opinion, should be so amended as to render the duties of the examiner-in-chief advisory only, so that an appeal, as formerly, may be taken from the examiner or from the Commissioner to the Circuit Court. All appeals should be taken from the decision of the examiner directly to the Commissioner, who could then refer it to the examiners-in-chief, or, if his time permitted, hear it in person.

The disturbed condition of the country has brought to view a deficiency in the patent laws with respect to the protection of the rights of assignees of inventions, which demands the attention of Congress. In many cases patents cannot be awarded to applicants except upon amendment of their specifications and claims. After an application has been once examined and rejected, the law requires a renewal of the oath of invention, by the inventor, before the amended specification can be re-examined. Cases have lately arisen where an inventor having filed his application for a patent, and assigned his whole interest in the invention, has disappeared or is *non inventus*, after the first examination and rejection; although in such case the defects in the specification might be cured by amendment, the inventor cannot be found to renew the oath required by law, and the assignee, the actual holder of the invention, is without remedy. In case of the death of an inventor before a patent shall have been granted for his invention, the right of applying for and obtaining a patent therefor devolves, by law, upon his executor or administrator. I would recommend that provision be made, by law, that when the inventor after making his application and assigning his invention may not be found, the right of renewing the oath of invention and amending the specification shall devolve upon the assignee.

It is difficult to conceive of any substantial reason for the provision contained in the 7th section of the law of 1836, which requires that an applicant for a patent, before making any alteration in his specification, "shall be required to make oath or affirmation anew." It is certain that no protection to the public is secured by this provision, while the requirement is a matter of great inconvenience to the applicant and the office. The inconvenience of this requirement has been particularly apparent since the number of foreign applications has been greatly increased, in consequence of the reduction of fees made by the law of 1861. Applications from Europe and California have often been delayed for months for the renewal of the oath required, before the slightest amendment could be made. I would recommend that the laws be so amended as to dispense wholly with the renewal of the oath of invention.

COPYRIGHT.

The duties connected with the custody of all books, maps and other publications deposited in the Department of the Interior, according to the laws regulating copyrights, having been imposed upon this bureau, for the execution of which duty a yearly appropriation is now required, I beg leave to recommend a reform which will not only save this expenditure, but secure other important advantages to the public.

By the act of Congress approved May 31, 1790, it was required of every person desiring to secure a copyright, to deliver a copy of the work to the Secretary of State within six months of its publication, "to be preserved in his office." This requirement continued in force under the amendment to the act approved April 29, 1802, and by the "act amending the several acts protecting copyrights," approved February 3, 1831, it was required that a copy of the work should, within three months of its publication, be delivered to the clerk of the district court of the United States of the district wherein the author or proprietor should reside, and that it should be the duty of the clerk once at least in every year to transmit all copies of works thus received to the Secretary of State, "to be preserved in his office." By an act approved February 5, 1859, the Secretary of the Interior was substituted for the Secretary of State, and all works and records heretofore received were ordered to be transmitted by the latter to the former, no change in any other provision of the copyright law being made.

It appears, therefore, that for a period of seventy years, from 1790 to 1860, one copy of every work claiming security of copyright has been required by law to be deposited in an executive department of the federal government for a period of forty years by the author directly, and for thirty subsequent years through the agency of clerks of the United States district courts. The result contemplated by this requirement was a collection of copyright matter at the national capital in the lapse of years, as valuable as it would be interesting, and it is to be regretted that circumstances should have tended in any degree to defeat this end.

The earliest record of the receipt of a copyright by the Secretary of State bears date January 19, 1796, although copies of two works, one dated 1794 and the other 1795, are found in the library, of the receipt of which no record exists. From 1796 to 1831, during which period copyrights were required to be transmitted directly to the Secretary of State by the author or proprietor, the record of certificates of receipt is unbroken; and during the eleven years from 1831 to 1841, both inclusive, the register of works received at the Department of State from United States district courts under the act of the former years, seems equally perfect. But here ceases all record or register at the Department of State of copyrights received, and for a period of twenty years, from 1841 to 1860, when a register was commenced at this office, whither the service had been transferred, the only source available from which could now be compiled a complete catalogue of all the copyrights entered during that period in the United States, are the lists and records, more or less perfect, transmitted more or less regularly by the clerks of the United States district courts, in accordence with the act.

From 1796 to 1831 the whole number of copyright works actually received at the Department of State was 2,212, while the whole number for the same period received from the Department of State in 1859 at the Patent Office was but 929, or less than one half. The whole number of copyrights received at the State Department from 1831 to 1841, both inclusive, was 10,073, while the whole number received at the Patent Office in 1859 was 6,017. The whole number received at the State Department from 1841 to 1859, both exclusive, is estimated in round numbers at 40,000, while the whole number received for the same period at the Patent Office did not exceed 30,000.

Out of some 50,000 copyright works, therefore, deposited in accordance with law, to be preserved, from 1790 to 1859, less than 40,000 are now to be found. It appears, also, from careful comparison of the records of applications for copyright with the list of works received for a series of years, that not more than two-thirds of all the works for which a copyright is requested are ever deposited with the clerks of the district courts of the United States, as is required by the act of 1831, or, if so deposited, are ever transmitted by the clerks to this city, as is also required.

The evil resulting from the continuance of such a state of things is too obvious to demand comment. It is easy to suppose a case in which the absence of copyright work from the place where the law requires it to be found, when called for as a legal voucher, might prove extremely detrimental to the interests of its proprietor, especially when it is considered that judicial decisions hold that proof of the fulfillment of the act in the minutest particular is indispensable to the security of the right.

The copyright works now received at this office are carefully registered and preserved, and this done at an annual expense of more than $1,600. That this service may be rendered self-sustaining, like the Patent Office, can be readily demonstrated, and thus a saving of the above-named amount be made to the treasury.

At the Stationers' Hall, in London, all applications for copyrights in England are made; from thence all certificates on the subject are issued, and there all works are received for preservation. The same service could be performed at the Patent Office for the United States, and be sustained by the same amount of fees now allowed clerks of the United States district courts by the act of 1831.

Under the existing law, the perfecting of a copyright is made dependent on the performance of certain duties by district clerks of the United States, no penalty being prescribed for neglect of those duties. These officials are not subject by any law to the directions of the department or office charged with the superintendence of the service. Hence, with perfect impunity, a clerk in one of the districts has for eight years refused to transmit either records or copyrights to this office, in obedience to the law, on plea of insufficiency of compensation. Other clerks are equally negligent of their duties. The present system has utterly failed to secure the object contemplated by the original enactment, and so valuable to those authors who desire protection for their works. Had the plan now suggested been carried out with the same fidelity as has been the Patent Office, we would now have a copy of almost every book, pamphlet, map, chart and musical composition ever published in this country. I need not enlarge upon the value of such a collection.

It is a subject of congratulation, to which I am happy to refer in closing this report, that notwithstanding the occupation of the public mind with the paramount thought of defending the government, and the apparent diversion of so much activity from peaceful to military pursuits, the business of this office, so sensitive to any financial or industrial change, shows a vitality in the industrial arts of the country not to have been expected in time of war. Of the applications for patents made during the month of December last, arranged according to the classification of the office, there were, in the classes of

Agricultural implements	63
Calorifics and photics	45
Chemical processes	40
Land conveyance and engineering	59
Fibrous and textile manufactures	9
Fine arts	24
Household furniture	31
Leather, harness, and wearing apparel	42
Lumber, stone and clay	19
Philosophical and surgical instruments	22
Navigation	8
Steam and air engines, hydraulics and pneumatics	35
Metallurgic manufactures	23
Firearms and implements of war	58

It appears by this statement that 420 were for inventions in the peaceful arts, and 58 only in implements of war. Although some of the former are adapted for military use, it would be safe to say that five-sixths are inventions connected with productive industry—a proof that the productive interests of the loyal States have not been materially disturbed by the national convulsion.

As the power to maintain war depends upon the productive labor of the country, and the capacity of production is increased by new inventions, it is hoped that Congress will regard the encouragement of an institution which stimulates and protects the inventive resources of the country as not simply a duty, but a national necessity.

D. P. HOLLOWAY,
Commissioner of Patents.

HON. GALUSHA A. GROW,
Speaker of the House of Representatives.

Bronze Guns.

At the Rogers locomotive works, in Paterson, N. J., experiments are being made in a peculiar mode of casting bronze guns; and we are glad to find them likely to prove successful. Mr. Morris from Pittsburgh, who has had large experience in the casting of the celebrated iron Columbiads for heavy fortification guns, is superintending the experiments. He is now turning his attention to applying the principle to the casting of bronze guns. These have hitherto been cast solid and the entire amount of metal of whatever caliber bored out afterward, thereby not only making much waste, but taking a vast amount of labor; and what is worse producing a gun, which on account of its softness, is very soon destroyed, more especially, if rifled and using a winged or conical projectile.

Those guns cast for Mr. Morris, are cast hollow, with what is known as the "circulating water core." This consists of a double tube, one within the other the outer one being coated with some kind of loam and sand in the usual manner of making cores: and the inner one, being smaller, leaves a space between its exterior surface and the interior surface of the outer one. The inner tube does not quite reach to the bottom of the other, but leaves a space for a return passage. Water is conveyed during the casting and cooling of the gun into the mouth of the outer tube which forces its way toward the bottom, and returning rises and escapes in a hot condition. Some twenty-five feet head is used for this injection water.

The mold is also different from the ordinary loam or the dry sand mold. It is composed of a mixture of Kaolin, clay, quartz and mica, the whole, when in combination, forming a perfectly fire-proof, and, at the same time, a very porous mold, leaving a free egress for the pent-up gases. This is, of itself, a desideratum in good casting.

The result of all this is a homogeneousness in the metal and therefore a greater capacity to bear strain—a harder surface for the abrading action of the cone shot, and a greater strength in proportion to its weight.—*Paterson (N. J.) Guardian.*

RAILROADS IN OHIO.—The first railroad charter in Ohio was passed in 1832, and the second in 1836; but nothing worthy of note was done in the way of building roads until after 1840—and it was not until after 1848 that the Ohio river and Lake Erie were connected by rail. Now there are 2,024 miles of road in operation which cost for roads and equipments, $153,000,000. This is the work of twenty years. The progress that has been made in this branch of improvements is an indication of the progress made by the State in wealth and industry.

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Improved Revolving Refrigerator.

A refrigerator affords all the benefits of an icehouse upon a limited scale, and is a very important household article. A simple and convenient refrigerator that will preserve the ice is, therefore, one of the most useful apparatuses about a house during the summer months. As its office is to maintain articles of food, which are liable to decay, in a fresh and natural condition, the atmosphere should be kept at a very low temperature. It is important that a refrigerator should embrace such adaptations as to render the chambers accessible, and a complete separation of meats, fish, fruits, milk,&c., so that the savor of one may not be injured by absorbing that of the other. The invention herein illustrated possesses these desirable qualities.

Fig. 1 is a perspective view. Fig. 2 is a top view in section, showing the interior arrangements, and Fig. 3 is a section of the lower portion. The exterior cylindrical shell may be formed of wood, or wood and metal combined, the interior cylindrical shell being made of sheet zinc. These two shells, as shown in Fig. 2, are arranged so as to provide a suitable air space between them. The interior of the refrigerator is divided into chambers, A B and C C. The former are distinct and close, and are formed by bending sheet zinc in the cellular form represented. The two latter communicate with one another, but are separated by the ice pan in the middle, which is furnished with zinc rods, *r r*, against which the ice is placed. Each chamber is fitted with shelves and a separate door. The entire case, embracing the chambers, revolves upon an axis, secured in its bottom, and it is also supported upon a series of rollers or casters, which are sustained on the sole plate. The ice is placed in the pan through the aperture shown on the cover.

This refrigerator is easily revolved, so as to bring each chamber successively in front, thus affording convenient access to its contents. Fresh meats, which are so liable to rapid decay, are hung up on hooks against the rods of the ice pan, to be kept in the coldest part of the refrigerator. And, for the benefit of our lady readers, we will here state that cut meats should never be laid down flat, because when so laid they are more liable to decomposition, as may be observed by their rapid decolorization. The ice is placed high up in the refrigerator, so as to produce that circulation of air which is necessary for each chamber. Fruits, and articles of delicate savor, are placed in the chambers, A B.

This refrigerator was patented January 7, 1862. For more information address the inventor, James P. Ellicott, Washington, D. C.

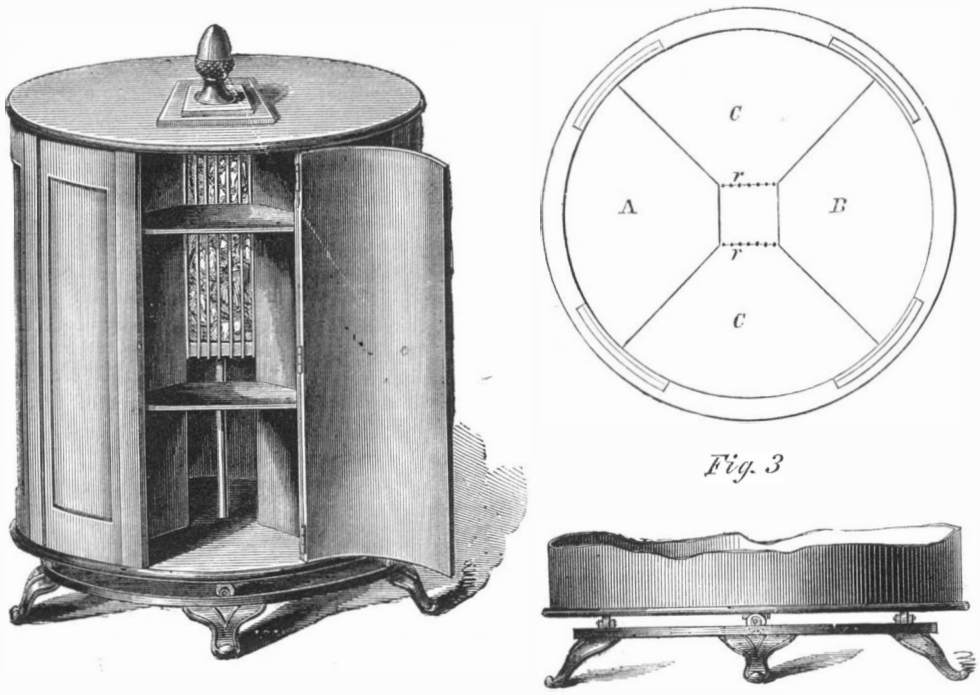


Fig. 3

ELLICOTT'S REVOLVING REFRIGERATOR.

Metallic Packing for Engine Pistons.

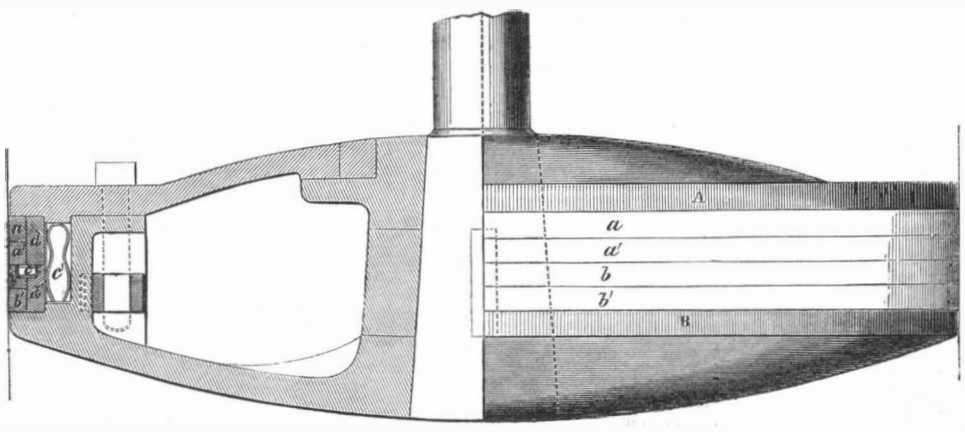
The piston of a steam engine requires to be packed in such a manner that it may be moved freely up and down, bearing steam tight against the inner surface of the cylinder without producing an undue amount of friction. To obtain such results the piston must be packed with some yielding substance that will remain in close contact with the cylinder. The pistons of the old engines were packed with gasket (braided hemp) which formed a yielding steam-tight band, but it was very liable to get out of order and it required frequent renewal. The adoption of a set of jointed metallic rings, as a substitute for gasket packing, was a great improvement, so far as it relates to durability and this packing has been long in use. As applied ordinarily, however, it is liable to leak at the upper and lower ring after a little wear, and the rings become loose and work up and down against the follower and piston flanges.

The accompanying engraving represents a piston —half in section—which embraces an improvement to obviate this evil. A is the follower flange, and B, the usual piston flange. Between these two are placed two sets of metallic packing rings, *a a'* and *b b'*.

They extend around the piston and are arranged above one another so as to break joints. Between these two sets of rings is a recess formed as shown in the sectional part of the figure in which are placed a series of figure, 8, springs *c*. The elastic pressure of these springs is exerted upward and downward on the two sets of packing rings, *a a'*, *b b'*, and they are thus kept in place and prevented from working loose. Behind these four outer packing rings are two others, *d d'*, which are also arranged to break joints, and behind these is also a circumferential recess in which are placed cylinder springs, *c'*, the pressure of which is outwardly, according to the common mode of ring packing, thus making the outer rings work steam tight against the surface of the cylinder. By this combination of springs and rings, the outer packing rings, *a a''*, *b b'* have a spring pressure exerted upon them in three directions, by which they are maintained in their proper position, and the piston works perfectly steam tight in the cylinder. This improved system of metallic packing, which was patented Oct. 5, 1858, has now had a long and fair practical test of its qualities. It has been applied to the steamboats *John Marshall*, *Anna*, *Sylvan Grove* and *Sylvan Shore*. We have examined certificates of the engineers of the first three boats, in which it is stated in substance that it is the best packing they have used; that the pistons run smoother and with one-third less tallow than with other common packing; and a considerable saving of coal has been effected by its use in the last-named boat.

No part of a steam engine is of greater importance than the packing of the piston. If it leaks the action of the steam is vitiated in the cylinder; and if it works too tight it cuts the cylinder, and is a constant source of trouble and expense.

The inventor and patentee is Mr. Hanford Horton, engineer of the *Sylvan Shore* steamboat, from whom more information may be obtained by letters addressed to the care of Hamilton Morton, Esq., 41 Wall street, or North River Iron Works, foot of Vestry street, this city.



HORTON'S METALLIC PACKNG FOR ENGINE PISTONS.

Improvements Wanted in Iron.

The *Railroad Journal* calls attention to the fact that no sheet iron yet made equals that of Russia, and no crude iron flows so freely as the Scotch pig. Unless these foreign irons can be imitated in quality, we shall always have to import them from abroad. Good smooth iron casting, cannot be made from American iron without mixing a portion of Scotch therewith; and certainly no sheet iron can compare with that of semi-barbarous Russia. If the peculiar quality of the Scotch pig was due to an ore found exclusively in Scotland, then perhaps we never could rival it; but this is not the case. The same kind of iron ore is found in various parts of the United States, and with the same agencies similar pig iron can surely be made here. With regard to the ore from which Russian sheet iron is made we are not so well enlightened. It is said by some to be peculiar to Russia, and by others to be a common magnetic ore, and that the superior quality of the sheets made from it is due to the process employed in their manufacture. We know that various attempts have been made to rival them, and some American sheetiron has the appearance of the Russian, when new, but the same quality of sheet metal has not yet been produced in America. The field for obtaining such iron is still open to the experiments of American inventors. Wealth always flows into those districts where iron manufactures are conducted upon an extensive scale.

WROUGHT-IRON SHOT FOR THE "MONITOR."—On page 114 we stated that 400 eleven-inch wrought-iron solid shot had been furnished for this vessel. We understand that she was provided with only 50 of these when she left on her eventful and gratifying mission to Fortress Monroe. Several of our cotemporaries have made a mistake in giving the weight of these shot at 284 instead of 184 lbs.

THE average consumption of saltpeter at present in the United States is 8,000 bags per month. The stock on hand just now is very small, but 13,664 bags are on their way from Calcutta.

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VOL. VI. NO. 12.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, MARCH 22, 1862.

WHAT CAN BE DONE FOR INVENTORS.---ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention hould accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past sixteen years, during which time they have acted as Attorneys for more than FIFTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,

No. 37 Park-row, New York.

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

In another portion of our paper we publish the first Annual Report of the Hon. D. P. Holloway, Commissioner of Patents. It is a plain, unpretending document, devoid of any striking originality, either in style or ideas; still it presents many interesting and instructive statements.

It appears from this Report that, although the war has produced a marked falling-off in the number of applications for patents, still the inventive mind of the country has not been idle. Nor has the genius of inventors been so exclusively employed in the development of war implements as we might at first suppose. During the month of December, 1861, out of 420 new applications for patents, only 58 were for purposes of warfare; all the rest were connected with the peaceful pursuits.

The Commissioner, in asking for further legislation in behalf of the Patent Office, very truly says :—"As the power to maintain war depends upon the productive labor of the country, and the capacity of production is increased by new inventions, it is hoped that Congress will regard the encouragement of an institution which stimulates and protects the inventive resources of the country as not simply a duty, but a national necessity."

The Report recommends a change in that portion of the law which allows an applicant for a patent to pay in $15 on account of the fee, and the balance ($20) *after* the Office decides to grant a patent. The practical operation of this method is to cause a suspension and postponement of the issue of hundreds of patents; thus producing a pecuniary inconvenience at the Patent Office, as well as increasing the liability to confusion and controversy between allowed pending cases and new applications. The Commissioner suggests a return to the old method, which required a payment of the full fee at the time of making the application, with a right to withdraw a part of the amount in the event of a rejection. Although there are difficulties connected with the practical operation of the law as it now stands, still we think that they are no greater than those which attended the old rule of withdrawals. One thing is certain: the present law tends to increase the number of applications for patents, because the fee required on making an application is so low—only $15; and thus the general object of all patent laws is secured, namely, "*the encouragemeent of new and useful inventions*," which, as the Commissioner says, "is a national necessity," We do not believe that the interests of the country or of inventors will be promoted by a return to the old system of withdrawals; and we think that it is better to let the present law alone, even though the Patent Office is subjected to some inconvenience. If any change must be made, let there be a limit of time fixed within which the applicant must complete his payments.

The Commissioner states that the *printing* of the patents, as provided by law, has been suspended for want of funds, and he asks an appropriation from Congress to continue the work. He says that, for a less amount than that heretofore expended for the printing of the usual illustrated Reports, a limited number of copies of each patent, with drawings in full, might be printed. He recommends that a type-printing concern and photographic establishment be attached to the Patent Office, to accomplish the above objects, the drawings to be all made by photography. We would suggest that the types be dispensed with, and the whole work done by the photograph. We have seen some copies of written patents, made in this manner, which equaled in legibility the best of printing, and in appearance were far neater than the Commissioner's printed parchment specifications.

The Report recommends a change of that part of the law which requires the *oath* to be renewed, after rejection. The rights of assignees are at present invaded by the absence or refusal of inventors to renew the oath, and much inconvenience and delay are involved. We fully concur with the Commissioner in the belief that no good, but only evil, results from the oath-renewal.

The Commissioner also asks for a reform of the law relating to *appeals*. As the law stands, no appeal can be taken from the Examiner to the Commissioner until the case has been acted upon by the Board of Examiners-in-Chief. Thus the Commissioner, although nominally the chief of the Patent Office, is in reality deprived of all voice, in certain cases, until a long string of "red-tape-ism" has been run through; and even then he cannot interfere unless the applicant pays him a fee greater than that required on making the original application. Clearly, the law should be amended, as the Commissioner asks.

The Commissioner speaks of various changes made by him in the position of Examiners, by which some have been reduced to the rank of Clerks and Second-Assistants, in order to cut down their salaries but still get the actual service of Examiners out of them. We do not see any thing to admire in this system; nor do we believe that its has been impartially exercised, or that it has resulted in economy to the Patent Office. Its fruit has been, so far as we have observed, to discourage some of the best and most faithful of the Examiners, while others, of less experience, ability and effective industry have, by "favoritism," been unduly promoted; still others have been retained in office who have long been regarded as unfit for their duties.

SPLENDID SUCCESS OF THE ERICSSON BATTERY.

In other parts of our paper will be found an illustrated description of the Ericsson battery, and a graphic account of her fight with the *Merrimac*. While the iron-plated *Merrimac* was carrying destruction among the old wooden vessels of our navy, and spreading consternation throughout the land, the little *Monitor* with her two guns arrived upon the scene of conflict, and soon changed disaster and defeat into the most triumphant victory. For several hours she was sailing around the *Merrimac*, sending her shot into any selected part of her antagonist with perfect precision, sustaining an unprecedented cannonade with absolute impunity, and finally succeeded in driving her formidable foe disabled away from the field of battle.

All circumstances combined to render this triumph one of the most perfect that has ever been achieved. Had the *Monitor* arrived at Hampton Roads one day earlier the *Merrimac* would not have had the opportunity of displaying her tremendous powers of destruction, and though the nation would have been exultant, the exultation would not have experienced that vigorous rebound which follows the serious apprehension of disgraceful disaster.

It was stipulated in the contract for the *Monitor* that she should be tried under the guns of the enemy before being accepted by the department, but it could not have been anticipated that she would be subjected to so severe a trial as that which she has endured, and that she would thus be able to so fully establish her invulnerability.

In all the numerous and costly experiments that have been made in England with armor plates, with Armstrong, Whitworth and other guns, the most destructive projectile yet tried has been spherical shot fired from a 68-pounder cast-iron gun. Spherical shot receive a higher initial velocity than elongated projectiles in consequence of the pressure of the gas being exerted against a larger area in proportion to the weight; but this velocity is more rapidly reduced from the greater resistance of the air in proportion to the *vis viva*. Now the 11-inch guns of the *Merrimac* carry balls weighing 184 pounds—nearly three times heavier than the most destructive shot ever tried against iron plates in England. These shot were fired at exceedingly short range—some of them said to be at only forty feet distance—and nine struck the turret of the *Monitor* without inflicting the slightest injury.

This contest was the most severe test to which armor plates have ever been subjected, and it puts the final seal to the fate of all wooden ships of war. Calling upon Capt. Ericsson the day after the fight to congratulate him upon the brilliant success, we found him engaged upon the drawings of a large sea-going steamer, after the plan of his battery, with the proper modifications for that class of vessel.

IMBECILITY IN THE NAVY DEPARTMENT.

The practical intelligence of the country has suffered an outrage, by the imbecility of the naval authorities. The press for a year past has strenuously urged upon the government, the importance of building iron-clad gunboats. Their better judgment in this matter has not been regarded, and the result is millions of dollars have been expended upon wooden ships, which are worthless against an iron-plated gunboat of the most ordinary character. The *Merrimac* destroyed two wooden frigates, disabled two wooden gunboats, recently built, and would have destroyed the splendid wooden steam frigate *Minnesota* but for the timely arrival of the little two-gun iron-clad *Monitor*. The whole naval management at Fortress Monroe appears to have been a splendid piece of stupidity, and the Navy Department is, no doubt, in the hands of those who are too much wedded to old notions. It appears plain to us that there has been a want of efficiency in this department, which may yet cost the country additional disgrace. We hope the President will not allow personal influences to override the interests of the whole people.

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T-RAIL SHELL-PROOF FRIGATES—LEARNING BY EXPERIENCE.

Nine months ago (on page 345, Vol. IV. (new series) of the SCIENTIFIC AMERICAN) we urged our naval authorities to proceed instantly and plate several powerful steamboats with T-rail, and thus render them shell-proof and adapted to attack forts and other strongholds of the enemy. We advised the employment of such plating, not because we thought it equal to forged, or rolled iron plates for the purpose, but to provide, in the shortest possible period of time, a number of invulnerable vessels for active warfare.

We said, "Let us adapt ourselves to the circumstances of the case and make the best use we can of what we have. Thus we have plenty of T-rail iron, and we think it can be bent and adapted to several powerful steamboats." Had our advice been acted upon, every shore fort, every harbor and vessel in secessiondom would now have been in the possession of the Union forces.

It grieves us to reflect that our navy, for the first time in this conflict, has been humiliated, in a measure, by the secessionists acting upon the very advice which our naval authorities stupidly rejected. Since we penned the article referred to, the sunken frigate *Merrimac* has been raised at Norfolk, plated with rail iron, and on the 8th inst. she steamed out into Hampton Roads, destroyed the frigate *Congress*, of 50 guns; the sloop-of-war *Cumberland*; the gunboat *Oregon*; injured several other vessels, and but for the timely arrival of the *Monitor* at the scene of action, she would have destroyed the *Minnesota*, and perhaps the whole of our shipping at Fortress Monroe.

The days of wooden war vessels are numbered. The *Merrimac* proved far more formidable than we had anticipated, and she has given us a dear-bought lesson. We could have had at least seven iron-clad vessels equal to the *Merrimac* ready for action at the present moment, instead of but one—the *Monitor*—had those in authority appreciated the practical information which has been published in our columns on iron-clad ships of war.

HOW LONG HAS THE SUN SHONE, AND HOW LONG WILL IT CONTINUE TO SHINE?

At the late meeting, at Manchester, of the British Association, Professor W. Thompson read a paper entitled "Physical considerations regarding the possible age of the sun's heat," in which he gave expression to some of those daring and sublime speculations that are constantly being suggested by our rapidly enlarging knowledge of the universe.

The author prefaced his remarks by drawing attention to some principles previously established. It is a principle of irreversible action in nature that, "although mechanical energy is indestructible, there is a universal tendency to its dissipation, which produces gradual augmentation and diffusion of heat, cessation of motion, and exhaustion of potential energy, through the material universe." The result of this would be a state of universal rest and death, if the universe were finite and left to obey existing laws. But as no limit is known to extent of matter, science points rather to an endless progress through an endless space, of action involving the transformation of potential energy through palpable motion into heat, than to a single finite mechanism, running down like a clock and stopping for ever. It is also impossible to conceive either the beginning or the continuance of life without a creating and over-ruling power. The author's object was to lay before the Section an application of these general views to the discovery of probable limits to the periods of time *past* and *future*, during which the sun can be reckoned on as a source of heat and light. The subject was divided under two heads: first, on the secular cooling of the sun; second, on the origin and total amount of the sun's heat.

In the first part it is shown that the sun is probably an incandescent liquid mass radiating away heat without any appreciable compensation by the influx of meteoric matter. The rate at which heat is radiated from the sun has been measured by Herschel and Pouillet independently; and, according to their results, the author estimates that if the mean specific heat of the sun were the same as that of liquid water, his temperature would be lowered 1°. 4 Centigrade annually. In considering what the sun's specific heat may actually be, the author first remarks that there are excellent reasons for believing that his substance is very much like the earth's. For the last eight or nine years, Stoke's principles of solar and stellar chemistry have been taught in the public lectures on natural philosophy in the University of Glasgow; and it has been shown as a first result that there certainly is sodium in the sun's atmosphere. The recent application of these principles in the splendid researches of Bunsen and Kirchhoff (who made an independent discovery of Stokes's theory), has demonstrated with equal certainty that there are iron and manganese, and several of our other known metals in the sun. The specific heat of each of these substances is less than the specific heat of water, which indeed exceeds that of every other known terrestrial solid or liquid. It might therefore at first sight seem probable that the mean specific heat of the sun's whole substance is less, and very certain that it cannot be much greater, than that of water. But thermodynamic reasons, explained in the paper, lead to a very different conclusion, and make it probable that, on account of the enormous pressure which the sun's interior bears, his specifie heat is more than ten times, although not more than 10,000 times, that of liquid water. Hence it is probable that the sun cools as much as 14° C. in some time more than 100 years, but less than 100,000 years.

As to the sun's actual temperature at the present time, it is remarked that at his surface it cannot, as we have many reasons for believing, be incomparably higher than temperatures attainable artificially at the earth's surface. Among other reasons, it may be mentioned that he radiates heat from every square foot of his surface at only about 7,000-horse power. Coal burning at the rate of a little less than a pound per two seconds would generate the same amount; and it is estimated (Rankine, "Prime Movers," p. 285, edit. 1859) that in the furnaces of locomotive engines, coal burns at from 1 lb. in 30 seconds to 1 lb. in 90 seconds per square foot of grate-bars. Hence heat is radiated from the sun at a rate not more than from fifteen to forty-five times as high as that at which heat is generated on the grate bars of a locomotive furnace, per equal areas.

The interior temperature of the sun is probably far higher than that at the surface, because conduction can play no sensible part in the transference of heat between the inner and outer portions of his mass, and there must be an approximate convective equilibrium of heat throughout the whole; that is to say, the temperatures at different distances from the center must be approximately those which any portion of the substance, if carried from the center to the surface, would acquire by expansion without loss or gain of heat.

The sun being, for reasons referred to above, assumed to be an incandescent liquid now losing heat, the question naturally occurs, how did this heat originate? It is certain that it cannot have existed in the sun through an infinity of past time, because as long as it has so existed it must have been suffering dissipation; and the finiteness of the sun precludes the supposition of an infinite primitive store of heat in his body. The sun must therefore either have been created an active source of heat at some time of not immeasurable antiquity by an overruling decree; or the heat which he has already radiated away, and that which he still possesses, must have been acquired by some natural process following permanently established laws. Without pronouncing the former supposition to be essentially incredible, the author assumes that it may be safely said to be in the highest degree improbable, if, as he believes to be the case, we can show the latter to be not contradictory to known physical laws.

The author then reviews the meteoric theory of of solar heat, and shows that in the form in which it was advocated by Helmholz it is adequate, and it is the only theory consistent with natural laws which is adequate to account for the present condition of the sun, and for radiation continued at a very slowly decreasing rate during many millions of years past and future. But neither this nor any other natural theory can account for solar radiation continuing at anything like the present rate for many hundred millions of years. The paper concludes as follows:—"It seems, therefore, on the whole, most probable that the sun has not illuminated the earth for 100,000,000 years, and almost certain that he has not done so for 500,000,000 years. As for the future, we may say with equal certainty that inhabitants of the earth cannot continue to enjoy the light and heat essential to their life for many million years longer, unless new sources, now unknown to us, are prepared in the great storehouse of Creation."

British Patents Issued.

The following is an analytical list of patents granted in England in 1861, as prepared by Mr. G. Shaw of Birmingham and published in the *Ironmonger*:—Working mines and raising mineral, 23; capstands, crabs, and windlasses, 8; raising weights, machinery for, 9; alarums, 4; reducing and smelting ores, &c., furnaces for, 19; iron manufacture, 24; steel manufacture, 23; lead refining, and making litharges, 5; copper and tin, 9; zinc, brass, and other alloys, 7; tinning, coating and plating metals, 17; casting metals and foundry operations and apparatus, 6; rolling metals, 4; drawing pipes and wire working, 6; pinching, die sinking, stamping, carving and ornamenting, 42; sawing, planing, turning and boring metals and wood, 38; metallurgical operations, various, 19; bellows, blowing machines and forges, 6; rolls and cylinders, 4; nails, bolts, screws, nuts and rivets, 24; chain manufacture, 6; files, rasps and cutting of, 1; saws and edge tools, 1; cutlery, 9; fenders and fire-irons, 2; locks, latches and fastenings for doors, 24; hinges and springs for hanging and closing doors, 11; casters for furniture, 6; spoons, forks and corkscrews, 1; tea and coffee apparatus, 4; Japan ware and papier-maché, 1; bell hangings and bells, 4; vices, 3; button manufacture, 11; pins, needles and fish-hooks, 5; firearms, 74; breeching, locks and triggers, 3; gun and pistol barrels, 4; ordnance and gun carriages, 38; shot and projectiles, shot and powder cases and fireworks, 48; gunpowder and detonating powder, 4; packing presses, hydrostatic and other, 13; mangles and calendring machines, 10; steam engines, 75; steam boilers and generators, 96; marine steam engines and propelling machinery, 38; railway and locomotive engines and carriages and railways, 83; sheathing and preserving ships' bottoms, 7; anchors, cables and stoppers, 8; springs for hanging carriages, 9; wheels for railway and other carriages and naves of wheels, 38; axletrees and axleboxes, 15; drags and retarding apparatus, 32; small wares, 2; surgical instruments and operations, 20; fire-proof safes and boxes and rendering articles fire proof, 2; miscellaneous machinery and apparatuses, 60; sewing machinery, 40; plows and plowing, 15; reaping and mowing machines, 35; thrashing, separating, winnowing and dressing grain, 11; hay making machines, 4; cutting chaff, turnips, &c., as food for cattle, 7; churns, churning and treating milk, 13; agricultural and horticultural implements and processes, various, 9; mills for grinding grain, coffee, &c., 14; fire and garden engines and syringes, &c., 10; water closets and urinals, 6; metallic pipes and tubes for water, steam and gas and joints for ditto, 25; cocks, taps and valves, 40; filtration and purification of liquids, 10; freezing and making ice and substitutes for ice, 2; lamps, lanterns, chandelliers and candlesticks, 32; warming and ventilating buildings, ships, carriages, &c., 29; stoves, grates, fire places and kitchen ranges, 24; jacks and roasting apparatuses, 1; culinary apparatus, various; mincing and sausage machines, 9; skates, 2; buckles and substitutes for, 1; stirrups, housings and spurs, ; horseshoes and substitutes, heels and tips for boots, &c., 12; type foundry and stereotype, 10; telescopes and microscopes, 4; miscellaneous optical instruments, cameras, &c., 7; mariners' compasses, 6; barometers, pressure gages, thermometers and hygrometers, 13; philosophical and mathematical instruments, miscellaneous, 5; weighing machines, 11; coffins, hearses and preserving the dead, 2. The following is the number of patents applied for in each of the last four years:—

In 1858	3,007.
In 1859	3,000.
In 1860	3,196.
In 1861	3,276

During the last year 536 patentees paid the stamp duty of £50, due on their patents at the end of the third year from their respective dates; and in the same period 138 patentees paid the stamp duty of £100 due on their patents at the end of the seventh year from their respective dates.

AN exchange recommends carrots in coffee. Dry it, grind and mix with coffee to suit the taste.

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Commerce of Egypt---Cotton.

Mr. Thayer, our Consul-General at Alexandria, has addressed a communication to Secretary Seward in relation to the commerce of Egypt. He states that the gross value of the merchandise imported into that country during the year 1861 was $14,206,053, while the exports amounted to $18,192,370. The principal article of export is cotton, of which the shipments last year were as follows :—

	Quantity. Cantars.	*Value.*
To England	494,950	$4,623,828
To France	149,124	1,745,841
To Austria	51,856	667,094
To other countries	268	3,139
Total exports	596,200	$6,979,902

Mr. Thayer adds :—

The average value for the year, per pound, according to the Custom House books, is thus 11 7-10 cents, or about one-half the present quotation. The fluctuations to which the traffic in this staple has been subjected, by reason of political agitations, have been referred to in my despatches, numbers 4, 6, 7, 8, 10, 12 and 13.

Grain stands next in consequence among the exports; the quantity of wheat alone exported during the year having been valued at 317,938 dollars, besides considerable quantities of Indian corn (*blé de Turquie*), beans, barley, &c.

The exports to America from Egypt are chiefly rags and gums. The imports are chiefly machinery, furniture and rice. Nearly all the machines used in the cleaning of cotton have been imported from the United States, as well as a considerable portion of the rolling stock used upon the Viceroy's railway to Suez.

The natural impediment to direct commerce between the United States and Egypt is obviously the identity of the principal exportable productions of the two countries —cotton and grain. Vessels can be freighted in the United States with goods which readily find a sale in Egypt; but, exceping rags and gums, they find here among the usual exports of the country few articles which would advantageously command a market in the United States.

Since, however, American bottoms have a preference in freights hence for Europe, a ship may come hither from the United States loaded with American manufactures, and take hence cotton or grain to Liverpool or Marseilles, where return cargoes to the United States can generally be obtained without difficulty.

The facility with which a profitable commercial intercourse between the two countries may thus be established does not appear to be generally understood by our merchants.

The Effects of Railway Traveling.

Mr. S. Solly, F. R. S., writes to the London *Lancet*:—My personal experience with regard to the effects of railway traveling may be given briefly. When perfectly well, I find no inconvenience from it; but if I am below par, suffering from any congestion of the brain, the result of over work or dyspepsia, and then take a long railway journey, it is certain to give me a headache, which I do not get rid of for a day or two. I always sit with my face to the engine, next to the window, which, as a rule, I prefer open, unless the weather is excessively cold. I do not think I ever got either catarrh or rheumatism from this exposure, as some would call it. I always read if the distance to be traveled is short, but I am sure that it is hurtful to read for any length of time on the rail. I know a public character who used to read incessantly, even if his journey extended from Liverpool to London; but the result was that he was obliged to give up all brain work and amuse himself (to use his own words), with the saw and the billhook. I do not mean to say the brain rest was required solely for the injury done on the rail, for he worked rather too hard at all times; but I am sure that it increased the mischief tenfold. For nearly a twelvemonth he could not read without immediately bringing on pain in his head. By rest, change, and very little medicine, he has now nearly recovered and will, I have every reason to believe be again able to serve his country in the senate, if not in the cabinet. If I am quite well, I can sleep the whole night through almost as well on a railway carriage as in my bed. All these observations apply to first-class carriages. I soon found, even in early life, that I could not endure the rattle and vibration of a second-class carriage. In all cases of congestion of the brain, or a tendency to it, railway travel is injurious. Recently I was visited by a patient, aged 62, who had been suffering from congestion of the brain, which had been completely relieved by medicine and twenty-four leeches to the temples. I had permitted him to go down to Reigate to see about a house previous to his residing there permanently to lead a very quiet life in that beautiful locality. He told me that he had felt perfectly well since his last visit to me, until he traveled up this morning by rail. The motion had reproduced the giddiness from which he had been free for more than a week. This case, perfect in itself, is only one among many that I could adduce in proof of my assertion that a brain disturbed by congestion is injuriously affected by motion on the rail.

Distilled Water for Soldiers on Coast Islands.

In a late lecture delivered on the application of science to military purposes, by F. A. Abel, director of the chemical establishment of the British war department, he gave the following instructions respecting a supply of drinking water on coast stations, such as those on which some of our troops are now encamped on the Southern coast. He said :—The regular supply of drinkable and wholesome water to troops at many coast stations, and in positions temporarily occupied in time of war, has, on many occasions, been attended with formidable difficulties, which, in some cases, have been met by the employment, in such localities, of an apparatus consisting of an efficient condenser, whereby distilled water is produced from the steam generated in the ship's or other boilers. The product, which exactly resembles ordinarily-distilled water, though drinkable, is by no means pleasant when first obtained; it is entirely wanting in the briskness more or less common to all fresh water, and which is due to the gaseous matter contained in solution. If this water be, however, kept in partially-filled tanks for some time, and, particularly if, by the motion of a vessel, for example, it be maintained in continual or frequent agitation, it becomes partially aërated, and is thus rendered somewhat more palatable. It always possesses, however, the peculiar unpleasant flavor of distilled water, which has been produced from steam generated in metal vessels, and which is due to the presence, in solution, of minute quantities of empyreumatic matter, resulting from the decomposition of organic substances contained in the water. This flavor may be at once removed by passing the aërated water through a vessel containing charcoal, which absorbs the minute quantities of organic matter, and promotes their rapid oxidation by the oxygen dissolved in the water.

By combining the application of this fact with a simple ingenious and very efficient method of aërating the distilled water, Dr. Normandy, whose apparatus was illustrated on page 257, Vol. II. (new series) Scientific American, has succeeded in effecting one of the most important and recent improvements in the purification of water, and one which has already received several applications in connection with the military service, though its benefits will unquestionably be far more extensively experienced by all branches of the marine service.

Extensive Rubber Works Burned.

The Beverly (Mass.) Rubber Works were destroyed by fire, on the night of the 5th inst. It originated in the heating room and the goods in the heater, a large quantity of old rubbers to be "restored," and other highly inflammable materials in the immediate vicinity were soon enveloped in flames, causing the work of destruction to extend with fearful rapidity. Some of the machinery was new and very valuable. The loss, though not accurately ascertained, cannot fall short of $100,000. There is an insurance of $70,000 effected, consisting of $5,000 each in fourteen companies. Mr. Green, the business agent, had returned on the same evening from Washington, with a contract for 70,000 blankets. By this sad disaster, the government may be at least discommoded, and 400 or 500 operatives will be thrown out of employmen. This will be severely felt, since this was the most prosperous business of the place, affording employment to many not immediately connected.

The Water Commissioners of Detroit have contracted with Messrs. Jackson & Wiley, of that city, to build them an horizontal condensing engine of eight feet stroke, and having a cylinder of forty-two inches bore. It is intended to run at about eighteen revolutions per minute, and will therefore be nominally a 300-horse-power engine. Its capacity for pumping is expected to exceed 7,000,000 gallons of water per twenty-four hours.

Orders have been received to start up, as soon as possible, all the machinery for fine work of the Boott Corporation Mills, in Lowell. The Company has been running, recently, about half its machinery for this kind of goods—sheetings, shirtings and print cloths, No. 30. They have about two thousand bales of cotton now on hand—enough to last about six months.

Scientific Ants.

A correspondent of the New York *Times*, writing from the island-rock of St. Helena, says that the people there are in great trouble. "About fourteen years ago a ship from Fernando Po, bringing a cargo of lumber, brought also a lot of white ants, which have multiplied and spread to such an extent that the whole town is being gradually destroyed by their ravages. They infest a house, and in an incredibly short space of time the frames, posts, in short all the woodwork of the house, is reduced to a mere shell. The ants are indefatigable workers; night and day a low monotonous clicking sound can be constantly heard, testifying to their sleepless industry. They do not attack the outside of a timber, nor do they ever expose themselves to daylight for a moment. Between one of their haunts and another, should the route cross an open space, they build a perfectly-arched covering, and under it constantly pass and repass. They eat out the inside of a timber, and perhaps the first intimation that one obtains of any defect in an apparently sound beam is its crushing and coming down. Among other buildings that have suffered, that of our Consul, Mr. Carroll, I particularly noticed. Nearly one-half of the building lay on the ground, having fallen in. He showed me a piece of timber which had all the appearance of being perfectly sound. Upon pressing it with my hand, it crushed like an egg shell. Not only wood, but books, paper, clothes, leather, in short any thing softer than iron, furnishes the ants with food. The people are becoming very much alarmed, and the town has offered a reward of $5,000 to any one who can find an exterminator. Wood has been smeared with various substances, but it made no difference, it is the inside, not the out, that they are after. The black ant seems to do more toward suppressing them than any thing else, as the latter eats the white ants, but unfortunately the white outnumber the blacks on the island, thousands to one. Teak and yellow pine are the only woods that resist them at all; the former is too hard, and the latter is too sticky for them. Their implement is augur-shaped, and the resin chokes it up. The people had begun to use iron houses. An iron church, done up in boxes, had arrived from England."

Curious Collection of Arms.

The Chicago *Tibune* gives an account of the curious collection of arms taken from the Fort Donelson prisoners. Any curiosity hunter, or dealer in second-hand relics of almost antediluvian days, might there find matter of profit and interest. Sword canes dating their manufacture from the year one—pistols of curious and unique workmanship, dangerous only to the reckless hand that dare discharge them— revolvers of later origin, but equally effective in warfare, sans barrels, sans stocks, locks, hammers, &c.—dirks of fabulous dimensions, hammered out of files and rasps, with sheaths of untanned horse hide—dirks with handles and without, and all the smaller arms, from a butcher knife to a saber. The accouterments were of the same novel charater. Some 200 small powder horns, such as the aborigines used for powder, were taken, intended, perhaps, to carry the ammunition for the aforesaid pistols. There were a few, and only a few, revolvers and pistols of modern date, showing that, however well the rebels may have been supplied with powder and ball at Donelson, their stock of small shooting irons was decidedly low. Their muskets and swords were equally diversified in age and make.—*Chicago Tibune*

Gas Burning Poisons.

Illuminated gas is never pure. It always contains bisulphide of carbon, and occasionally sulphureted hydrogen. Both these agents are combustible, and when burned yield fearful contaminations. The first result is a gas called sulphurous acid: the very same that is evolved from burning sulphur, and it speedily changes into oil of vitriol. The results of gas combustion are not harmless, because invisible; rather the reverse. Were they like smoke, visible, then the most incautious would guard against them. The products of gas combustion should always be conveyed away by a chimney terminating in an inverted funnel.

We learn from the Boston *Commercial Bulletin* that the Humane Society of Massachusetts has 66 lifeboats, 8 mortar stations and 17 huts of refuge on the coast of Massachusetts.

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RECENT AMERICAN INVENTIONS.

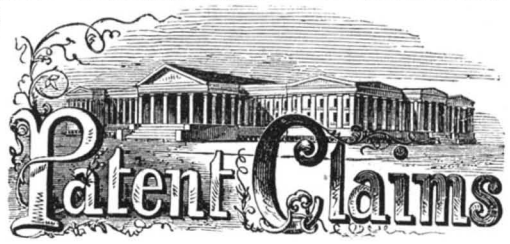
Harvesters.—This invention, patented by G. W. Richardson, of Evansville, Indiana, relates to an improvement in the construction of the frame of the harvester, whereby the finger bar and sickle may be readily adjusted to any desired hight, and the finger bar at the same time be well braced and supported, so as to be perfectly capable to withstand all strain to which it may be subjected. It also relates to an improved arrangement of the sickle driving mechanism, whereby the same is brought in quite close proximity to the driving wheel, and much side draft prevented, and a longer pitman than usual allowed to be used in order to facilitate the operation of the sickle.

Gas Carbureter and Regulator.—This apparatus, patented by J. A. Bassett, of Salem, Mass., consists of a vessel containing a series of annular passages, arranged concentrically one within another, around an upright axis, and communicating with each other on opposite sides alternately, and a second vessel, filled with a porous material, arranged above the first-named vessel, and communicating therewith by means of an interposed valve attached to the same stem, with an inverted cup-shaped float, arranged in the lower vessel, and with a valve at the mouth of the inlet, by which the gas enters the latter vessel from the main. Both of the vessels contain naphtha or other hydro-carbon liquid, and the lower vessel serves partly to effect the naphthalizing process, but mainly as a cooler, to cool the gas before its advent to the upper vessel, in which the naphthalizing is mainly performed and completed. The regulation of the flow of gas is effected by the inverted cup and the valve at the inlet, and the valve interposed between the two vessels serves by nearly shutting off the gas when the liquid in the lower vessel gets very low, to give notice that the said vessel requires replenishing.

Improvement in Projectiles.—This invention, patented by Charles W. Small, of Bangor, Maine, consists in furnishing an elongated projectile with a packing formed of a number of strips of wrought-iron, copper or other tough but flexible metal or material, partly imbedded in the metal of which the projectile is composed, and lapping each other on the outside of the projectile, in such manner as to form around the rear thereof, a tube, which is divided into sections, and capable of being expanded against the bore of the gun, by means of the pressure of the gases of the gunpowder against its interior, and so made to prevent windage, and, in the case of rifled guns, made to fit the rifle grooves, and obtain for the projectile a rotary motion, which is preserved in a great degree during the flight of the projectile by the further expansion of the sections of the tube after the discharge from the gun has taken place, and the consequent pressure of the spirally-formed edges of the said sections against the atmosphere.

Calendar Clock.—This invention relates to the construction of the wheel generally known as the day-of-the-month wheel, carrying the index which denotes the day of the month upon the dial or calender. This wheel has been variously constructed, and had various devices attached to it to provide for its making $\frac{1}{31}$, $\frac{2}{31}$, $\frac{3}{31}$, or $\frac{4}{31}$ of a revolution at the expiration of every month, according as the month has thirty-one, thirty, twenty-nine or twenty-eight days, but its construction and attachments have been generally either complicated or liable to get out of order. The invention consists in the construction of the wheel with three of its thirty-one teeth progressively shorter than the remaining twenty-eight, that by the use of a properly-operated click to move the wheel and a properly-controlled detent to stop it, one, two, three or four teeth, as may be required, may be caused to pass the detent at the expiration of the month, and so permit the movement of the day-of-the-month index from the position which indicates the number 31, 30, 29 or 28 of the last day of one month to the position which indicates the number 1. Patented by Eugene M. Mix and James E. Mix, of Ithaca, New York.

Hub-Turning and Mortising Machine.—The object of this invention is to obtain a machine by which hubs may be turned, and then mortised to receive their spokes, the turning and mortising being performed at one operation. The invention consists in combining with an ordinary turning lathe, a slide rest provided with a cutter, and also with a mortising tool, the parts being so arranged that the cutter may, by a simple manipulation, be first made to act against the work, and turn the hub in proper form, and the mortising tool then made to act and mortise the hub. Patented by Edwin M. Scott, of Auburn, New York.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 4, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

34,555.—J. S. Atterbury, J. Reddick and T. B. Atterbury, of Pittsburgh, Pa., for Improvement in Molds for Glassware:

We claim, first, The means and manner, substantially as described, of pressing articles of glassware in bas relief.

Second, The means and manner of uniting the bas-relief glass work to the outer surface of blown glassware, substantially as described.

34,556.—B. H. Bartol, of Philadelphia, Pa., for Improvement in Steam Boilers:

I claim the furnace, B, diving flue, H, one or more horizontal flues, J, and the return flue, M, with its vertical tubes, the whole being arranged within the casing, A, as and for the purpose set forth.

34,557.—J. A. Bassett, of Salem, Mass., for Improved Apparatus for Corbureting Gas:

I claim, first, The combination, substantially as described, of a vessel, A, in which the gas passes circuitously over the surface of the hydrocarbon liquid, to be partly carbureted and cooled by the evaporation of the liquid, and a vessel, B, containing a porous substance, and saturated with such liquid, through which the gas subsequently passes, as set forth.

Second, The gas-regulating valve, j, and float, k, combined with a gas-naphthalizing or carbureting apparatus, substantially as specified, that is to say, with the float floating in the naphtha or other hydro-carbon liquid used for the carbureting process.

34,558.—R. H. Blair and A. W. Beatty, of Saltsburgh, Pa., for Improvement in Horse Rakes:

We claim the connecting of the bar, K, of the rake, to springs, Q Q, through the medium of the arms, J J, rods, O, and links, P, in connection with the rods, I I, crank shaft, F, lever, G, and rack plate, E, all arranged and mounted, as shown, to operate as and for the purpose set forth.

[This invention relates to an improved horse rake, of that class in which wire teeth are employed. It consists in the peculiar arrangement of the rake head, its connection with springs and an adjusting lever, whereby the manipulation of the rake is rendered extremely simple, and the device placed under the complete control of the operator.]

34,559.—J. M. Blake, of Madison, Wis., for Improvement in Horse Powers:

I claim, first, The endless apron, A, when constructed substantially as described, with supports, f, and connecting blocks, a.

Second, The arrangement of the large friction rollers, B, drum, C, and end roller, D, in combination with the endless apron, A, substantially as and for the purposes specified.

34,560.—Joseph Bondy, of New York City, for Improvement in Knapsacks:

I claim the straps, D D, extending from and connecting the rear upper edge of the knapsack to the shoulder straps or strap, C, which are fixed to the front side of the knapsack, substantially as and for the purpose specified.

34,561.—W. H. Brown, of Worcester, Mass., for Improvement in Breech-Loading Firearms:

I claim, first, The peculiar method of moving the barrel in both directions, and holding it against the breech, J, by means of the locking bar, D, in combination with the parts, E F and G.

Second, The combination and relative arrangement of the inclined or wedge-shaped adjustable packing piece, o, with the stock and front-beveled end of the locking bar, D, substantially as and for the purpose set forth.

Third, The combination and arrangement of the adjusting piece, E, with the adjusting screws, e and r, for adjusting the pressure of the barrel against the breech, substantially as set forth.

Fourth, The combination and peculiar arrangement of the connecting piece, F, with the locking bar, D, and the lever, G, as described, whereby it is allowed a longitudinal motion to facilitate the passage of the joint, c, past the plane of the axes, n and a, during the operation of locking and unlocking the barrel.

Fifth, The combination with the stationary breech, J, and the recessed rear end of the barrel, B, of the projecting hooks, m m m, constructed and arranged to operate as described, whereby the cartridge case can be placed in position by a simple downward movement of the hand, and there retained in a central position as respects the bore of the barrel, until after the charge has been fired and the barrel unlocked, for the purposes set forth.

34,562.—R. S. Chapin, of New York City, for Improvement in Lamps:

I claim, in combination with the wick tube, constructed as aforesaid, the deflecting cap, e, applied in the manner and for the purposes specified.

34,563.—W. Z. W. Chapman, of New York City, for Improvement in Fastenings for Cartridge Boxes:

I claim the clasp, f, formed substantially as specified, and applied to the lower part of the flap of a cartridge or cap box, and connecting to the bottom of said cartridge or cap box, in the manner set forth, so as to form a fastening that can be worked by the fingers in the act of opening or closing said box, as described and shown.

34,564.—C. W. Clewley, of Providence, R. I., for Improvement in Watch and Locket Cases:

I claim a rim for lockets and similar metallic cases, formed of sheet metal, in such manner that the face of the field piece within the case and the exterior surface of the rim are both formed from the same side or surface of the original sheet metal, and that the field piece and rim are of one piece of metal.

34,565.—F. H. Cuypers, of Newark, N. J., for Improvement in Hinges and Hooks:

I claim, first, The combination of the wedges, B, casing, C, and tongues, E, constructed and operating as set forth.

Second, The combination of the projecting flange, F′, with a hinge, having tongues expanded or deflected by wedges, as explained.

[By means of this invention hinges may be attached to wood, stone, iron or other material, without the aid of screws or any of the customary modes of fastening, and are more securely held than by the means in common use.]

34,566.—W. H. Doane, of Chicago, Ill., for Improvement in Machines for Cutting Veneers:

I claim the combination of the cast-iron concave and curved-grooved ribs, with the brass faces or other equivalent metal, arranged and connected in the manner and for the purpose specified.

34,567.—G. A. Dabney, of San José, Cal., for Improvement in Apparatus for Operating Churns:

I claim the arrangement of the vibrating frame, J, arm, m, and connecting rod, m′, in combination with the cord, f, dasher, I i j, tub, F, and swinging frame, E a b, constructed and operating in the manner and for the purpose shown and described.

34,568.—Alexander Douglas, of English Neighborhood, N. J., and S. S. Sherwood, of Acquackanonck, N. J., for Improvement in Ladies' Skirts:

We claim, first, The combination, in the manner described, of the hoops, 1 1, tapes, 2 2, and braids, 3 3.

Second, The combination with the waistband, 8, and with each other, of the metal plate or strap, 6, and the eyelets, 7 7, substantially as set forth.

Third, The construction of the slides for expanding the skirt, with continuous bars upon the outer side of the hoop, or side furthest from the sliding portion, and with pointed teeth upon the inner side instead of continuous bars, in the manner and for the purpose described, the pointed teeth alternating with the bars, as shown.

Fourth, The combination with the upper continuous hoop of the stay, 4, and eyelet, 5, substantially as described.

34,569.—Daniel Fitzgerald, of New York City, for Improvement in Tents:

I claim, first, Constructing a tent in the calèche form, so that it may fold compactly together, vertically in a flat form, and be readily erected, substantially as described.

Second, The use of the flanged collars to hold the radial braces, constructed substantially as described.

34,570.—F. B. Franklin, of Appleton, Wis., for Improved Spring Bed Bottoms:

I claim the combination of the coils, F F, loops, G G′, rods, H H′, and eyes, E, all constructed, arranged and connected in the manner shown and explained, so as to constitute a continuous elastic web.

[The object of this invention is a bed bottom, formed of a series of wire coils and loops, and its superiority consists in so constructing and connecting the coils that they shall form a continuous web of greater elasticity than spring bed bottoms in common use.]

34,571.—W. O. Grover, of Boston, Mass., for Improvement in Sewing-Machine Needles:

I claim an eye-pointed needle, having an interrupted groove on one side and a continuous groove on the other, substantially such as is described.

34,572.—O. B. Hatfield, of New York City, for Improved Elevator:

I claim the construction of an elevator or dumb waiter, supported wholly upon one side, ascending and descending in a vertical course, substantially in the manner described.

34,573.—W. G. Hermance, of Albany, N. Y., for Improvement in Straw Cutters:

I claim the combination of the bell crank, lever, G, link, E, knife, F, and standards or arms, C D, cast or secured to the mouthpiece, B, substantially as and for the purposes set forth.

34,574.—G. B. Hicks, of Cleveland, Ohio, for Improvement in Telegraph Apparatus:

I claim, first, The employment of an adjustable magnet, m′ m′, as and for the purpose set forth.

Second, I claim the double armature lever, M, with the attached armatures, a2 a3, arranged and operating as specified.

Third, I claim the employment of the local battery, number 1, in combination with the helix, m′ m′, the conducting wires, w′ w′, and the points, o and e, arranged and operating as and for the purpose described.

Fourth, I claim the employment of two points, one on each end of the sounder armature lever, L, by means of which circuit through two magnets on opposite sides of the same armature, may be closed or broken simultaneously, and thus the armature lever held still for the purpose described.

Fifth, I claim the combination of the adjustable local magnet, m′ m′, with the receiving and recording instruments, when arranged and operated as and for the purposes specified.

34,575.—J. P. Hillard, of Fall River, Mass., for Improved High and Low Water Detector for Steam Boilers:

I claim the combination of the valve, B′, with two ports and detector, A′, with one port, and adjusting arm, J′, attached to B′, and float, F′, constructed and arranged to operate, so that when the water falls to a certain line in the boiler the float, F′, resting on the water will open the valve and allow the steam to escape through port, D′, to give alarm, and when the water rises to a certain line in the boiler, the float, F′, will rise and open the valve, and allow the water to escape through port, C′, and give alarm, substantially as and for the purposes set forth and described.

34,576.—W. H. Holbrooke, of New York City, for Improved Silicated Soap:

I claim the combining of a soluble alkaline silicate with rice flour, or an analogous flour by the process before described, or its equivalent, to be used as an ingredient in soap making.

34,577.—Samuel Jarden, of Baltimore, Md., for Improved Odorizer of Kerosene Oil:

I claim the manner of odorizing kerosene oil, as stated, or by combination with said essential oils in greater or less proportions, if the said manner of odorizing be substantially the same.

34,578.—W. H. Kelly, of Onondaga County, N. Y., for Improvement in Cultivators:

I claim the combination of the central beam, made as described, with the shares, 5, and shanks, a, when constructed and operating as set forth, and attached to the beam by means of clasps and bolts, as shown by Figs. 7 7.

34,579.—Benedikt King, of Providence, R. I., for Improvement in Cartridges Adapted to Breech-Loading Firearms:

I claim the use and employment of a cartridge having its base formed substantially as described, in combination with the groove, V, and plate, J, when said plate forms a part or one side of the groove or hole, V, being constructed and operating substantially as set forth.

34,580.—Lewis Kirk, of Reading, Pa., for Improvement in Brick Machines:

I claim, first, The formation of solid building brick by compressing the clay in and forcing it out of forming tubes and by subsequently trimming the ends by the means and substantially in the manner as described.

Second, Gradually condensing the particles of clay and expelling the air therefrom by compressing the clay in a separate chamber previous to its being forced in and through the forming tube by the means substantially as described and for the purposes set forth.

Third, In combination with the mechanism described for compressing the clay by forcing it in and through a forming tube, I claim a mechanism constructed, arranged and operating substantially as set forth, for dividing the compacted mass of clay into bricks of suitable length and for simultaneously trimming both ends.

Fourth, In a brick machine constructed to operate as described by forcing the compressed clay in and through a forming tube, I claim the mechanism for regulating at will the supply of clay into the compression chamber, substantially in the manner and for the purpose set forth.

Fifth, The mode described of dividing transversely the mass of clay compacted into shape by the employment, in combination with the revolving trimming knives, or their equivalents, of a fixed and movable platen and tray, constructed to operate as set forth, so as firmly to hold the mass of clay to constitute a brick, around its longer sides while it is being cut at its ends.

Sixth, The construction of the hopper with curved grate bars at the bottom thereof when said bars are provided with projecting teeth shaped and combined with revolving triturating blades, as described, the whole arranged substantially in the manner to operate as set forth.

34,581.—A. S. Lyman, of New York City, for Improved Process of Separating the Fibers of Wood and other Substances for the Manufacture of Paper Pulp:

I claim, first, Effecting the separation of the fibers of wood, hemp, flax, or other vegetable matters by subjecting them, in a close vessel or vessels, to the combined simultaneous action of a whipping, beating, rubbing, grinding or picking apparatus, and of water at a high temperature and pressure.

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Second, The washing out of the gummy and coloring matters or other soluble parts from the fibers by changing the water while the substances are being subjected to the combined or simultaneous action specified.

[Foreign patents have been taken out for this invention, and we shall soon publish an illustrated description of it.]

34,582.—P. W. Mackenzie, of Jersey City, N. J., assignor to Addison Smith, of New York City, for Improved Gas Compensator :

I claim the use of the compensating plates, A A, the connecting and adjusting rods, g and j, in combination with the valve, s, and circular valve seat, d d, or its equivalent, with long narrow ports, s s, the whole substantially as set forth.

34,583.—B. F. McAlhatten, of New York City, for Improved Bed for Ships and Hospitals :

I claim the construction of a bed with both the end pieces and the bottom pieces forming the bottom laths, made of air-tight chambers, the whole being arranged and combined in the manner and for the purpose substantially as described and specified.

34,584.—J. H. Mears, of Oshkosh, Wis., for Improvement in Rakers for Harvesters :

I claim guide, X, constructed and operating as set forth, and arranged relatively with guide, N, standard, 3, bevel wheel, S, and double rake, P, as and for the purposes set forth.

[This invention consists in the employment or use of a rake attached to an endless belt or chain, and used in connection with a guide ; the above parts being placed in such relation with the grain platform and all arranged in such a manner that the rake will, as the endless belt or chain is moved, traverse or sweep across the platform and take the cut grain therefrom and return back to its original working point in an elevated state, so as not to interfere during its return movement with the falling of the cut grain on the platform, nor with the bars of the reel which throw the cut grain thereon.]

34,585.—A. D. Milne, of Tiverton, R. I., for Improvement in Tobacco Pipes :

I claim, first, Providing the stem of a tobacco pipe with a removable metallic condenser substantially as and for the purpose set forth.

Second, Providing the bowl with a removable lining, constructed as described, in combination with the removable partition, substantially as and for the purpose set forth.

Third, Providing the stem with a valve which may be opened and closed at pleasure, as set forth.

34,586.—John Mittlehaus, of Berlin, Prussia, for Improvement in Setting Artificial Teeth :

I claim the construction of button-set teeth by combining the following elements :—First, a tooth plate, a, in proportion to length and breadth at more or less places perforated by oval openings ; second, an edge or rim, b, surrounding all openings of the tooth plate on the side facing the pituitary membrane ; third, a cover, c, a little larger than the said edge, soldered to the tooth plate at the side turned to the mouth hole, so as to leave a space between the tooth plate and the cover, substantially as shown and described.

34,587.—Robert Morrison, of Newcastle-upon-Tyne, England, for Improvement in Apparatus for Forging and Crushing Iron. Patented in England August 6, 1853 :

I claim, first, The system or mode of constructing such apparatus with the piston, piston rod, or hammer bar and guides in one solid mass.

Second, A hammer bar for steam hammers, constructed substantially as described and arranged in relation to other parts of the apparatus, so as to dispense with the use of guides below the cylinder.

34,588.—B.W. Nichols, of Fair Haven, Conn., for Coupling for Octaves, &c., in Melodeons :

I claim a melodeon valve made with its rear portion so extended and beveled that it may be opened by pressing the rear end toward the reed board, as readily and effectually as by pressing the front end from the reed board, when it is made and fitted for the purpose of coupling octaves, substantially as described.

Second, I claim the use of the shaft cam, C, when it is made to serve the double purpose of bringing the diagonal levers into position, and also forming a complete fulcrum on which the whole series of diagonal levers may be vibrated, when made, located and used substantially as described.

Third, I claim the use of a series of single diagonal levers, c, in combination with valves, d, fitted to be worked at both ends, for the purpose of coupling octave, when the whole is constructed, arranged and fitted to produce the result, substantially as described.

Fourth, I claim the use of the series of single diagonal levers, c, in combination with the shaft cam, C, when constructed, arranged and operated substantially as described.

34,589.—L. C. Palmer, of East Winsted, Conn., for Improvement in Furnaces for Heating Scythes, &c. :

I claim the arrangement of the recess, G, and ledge, g, with the fire box, B, flue, D, and openings, i, as and for the purpose shown and described.

[The object of this invention is to obtain a furnace by which the metal bars or stock used in the construction of scythes may be heated more economically than hitherto.]

34,590.—J. L. Plimpton, of New York City, for Improvement in Fastenings for Skates :

I claim, first, The combination of the connecting link, D, and sole plate, A, with an adjustable or permanent stop, substantially as described.

Second, The connecting link, D, lever and catch, or equivalent device, in combination with the stop, E, and sole plate, A, when combined and arranged to operate substantially as described.

[An engraving of this invention was published in our last number.]

34,591.—H. J. M. Puistienne, of Paris, France, for Improved Mode of Treating Copper Ores :

I claim the mode set forth of treating copper ores ; and particularly the application of sulphur, chloride of calcium or chloride of lime, or other chlorides, for the purposes of the present invention, and I wish to be understood that the proportions of the chemical agents mentioned may be varied according to the nature of the copper ores to be operated upon.

34,592.—G. W. Putnam, of Smithfield, N. Y., for Improved Device for Purifying Butter :

I claim having the vessel, A, provided with butter escape openings, g, in combination with the adjustable perforated slides, h, substantially as shown and described for the purpose set forth.

[This invention consists in separating buttermilk, brine and other liquids or semi-liquids, from butter by subjecting the same to a requisite pressure within a suitable vessel or chamber provided with eduction passages, whereby the particles of butter are made to adhere together, and the foreign fluid substances strained out or separated therefrom.]

34,593.—T. C. Richards, of Milwaukie, Wis., for Improvement in Curtain Fixtures :

I claim as a new article of manufacture, a curtain fixture or pressure roller, constructed as and for the purpose set forth.

[This invention relates to an attachment which is designed to be applied to the ordinary curtain or shade fixtures now in common use, and is intended to obviate the slipping of the cord on the pulley which is attached to the upper roller.]

34,594.—E. P. Russell, of Manlius, N. Y., for Improvement in Harvesters :

I claim the combination of the tapering or conical rollers, a, with the bevel outward on the flange, c, operating as described and for the purposes set forth.

34,595.—E. M. Scott, of Auburn, N. Y., for Improvement in Machines for Turning and Mortising Hubs :

I claim the pivoted bar, I, provided with the parallel guides, f f, and sliding heads, J N, the heads being provided one with the cutter, M, and the other with the chisel, O, and augers, j, and the head, J, operated by a screw, K, and connected with the head, N, by a bar, T, when required ; all being arranged and combined with a turning lathe, to operate as and for the purpose set forth.

34,596.—C. W. Small, of Bangor, Maine, Improvement in Projectiles for Rifled Ordnance :

I claim furnishing a projectile with a packing formed of strips, a b a b, of flexible metal partly imbedded in the metal of which the projectile is formed and partly lapping each other on the exterior of the projectile, in such a manner as to form an expanding tube, substantially as and for the purpose specified.

34,597.—C. L. Spencer, of Providence, R. I., for Improvement in Mode of Converting Motion :

I claim the use of the spring, I, or its equivalent, in combination with the curved connecting rods, G G, for the purpose of enabling the operating pawls to be so adjusted as to obtain an effect upon the shaft equal to the action of the crank, while the danger of hanging upon the dead point is prevented, substantially as described.

34,598.—L. L. Stearns (assignor to himself and L. M. Meigs), of Jersey Shore, Pa., for Improved Washing Machine :

I claim the construction of the adjusting lever, C, in connection with the main lever, B, and in combination with the spring, D, substantially as and for the purpose specified.

34,599.—Collins and Munroe Stevens, of Boston, Mass., for Improvement in Clocks :

We claim the tooth or detent, M, turning about a center pivot or support, as described, in connection with the lever, m m, substantially as and for the purposes set forth.

We also claim the method of relifting and relocking the lever, m m, and the tooth or detent, M, by the cams, u, substantially as described.

We claim the combination of the wheel, h, the wheel, c, and the shaft, i, as described for the purpose of rewinding the spring at the escape wheel, substantially as described.

We further claim the socket, v, protruding through the plate, B′, in the manner described, in combination with the arm, w, the pin, y, and the spring, x, substantially as described, for the purpose of setting the time part of the clock.

34,600.—W. W. St. John, of Pleasant Mount, Mo., for Improvement in Current Water Wheels :

I claim fitting the pairs of buckets, g h and i k, when arranged at right angles upon the adjustable block or hub, f, in the manner specified, so that said buckets, by the adjustment of the block, can be so placed as to return above the surface of the water, while the buckets in action are immersed as much as possible, as set forth.

34,601.—J. F. Tapley, of Springfield, Mass., for Improvement in Printing and Cutting Paper :

I claim the combination of the cutter or die, B, with the block, C, and springs, D D, or their mechanical equivalents, when constructed and operating substantially in the manner and for the purpose fully set forth.

34,602.—Elmer Townsend, of Boston, Mass., for Improvement in Canister or Case Shot for Ordnance :

I claim the arrangement and combination of the wings, h, with the head, H, the case, A, and the charge of balls thereof, the whole being to operate together, substantially as and for the purpose or purposes as specified.

I also claim the combination and arrangement of the part, C, with the shell case, A, the sabot, D, and the packing, d.

I also claim the combination and arrangement of the cap, G, and one or more lateral orifices, f, with the fuse tube and a chamber, n, formed in the rear end of the sabot, as specified.

I also claim the combination of one or more flanches, k k, or the equivalent therefor, with the loading chamber and the winged head applied thereto.

I also claim the construction of the cap, l, and the wings, h, viz., in two separate parts, substantially in manner and so as to be combined together, as described.

34,603.—G. O. Townsend, of Boston, Mass., for Improvement in Tents :

I claim, first, Elevating or erecting the tent and graduating the tension of the canvas, A, thereof, by means of a sliding frame, D, placed on the pole, B, and operated by means of the screw, C, on the pole, and the ring or band, E, and pin, d, or their equivalents, as set forth.

Second, The combination of the toggles, and attached cords, p q, with the flaps, l, in the manner shown and described.

[The object of this invention is to facilitate the raising and lowering of the tent, as well as to afford a ready means for regulating the tension of the canvas, and thereby compensate for the damp and dry state of the atmosphere, and admit of the canvas being kept properly strained or stretched at all times, avoiding the loosening and sagging of the same in dry weather, and also avoiding the undue tension occasioned by the absorption of moisture in wet weather, which, in tents of ordinary construction, is frequently so great as to either rupture the canvas or draw the tent pins out of the earth. An illustration of this invention will appear in our next number.]

34,604.—J. B. Van Deusen, of New York City, for Improved Car Coupling :

I claim the shackle, D, provided with the spiral flanches, a a, in combination with the drawheads, A A, having spiral openings, C C, arranged relatively with the flanches, a a, of the drawheads, to operate as and for the purpose set forth.

I further claim, in connection with the shackle and drawheads, A A, the back-plates, b, attached to the frames, B, and provided with the recesses or notches, c, for the purpose of holding or sustaining the shackle, as set forih.

[This invention consists in having a shackle provided with spiral flanches at its ends, and using, in connection therewith, drawheads having spiral or screw-shaped openings to receive the spiral flanches of the shackle.]

34,605.—George Westinghouse, of Schenectady, N. Y., for Improvement in Grain and Seed Winnowers :

I claim the arrangement together of the swinging shoe, H, when operating, as specified, fan, C, and adjustable box, N, as shown and described for the purpose set forth.

[This invention consists in giving the shoe of the machine an oblique vibratory motion at an angle of about 45°, so that the straws of the grain will not catch into the meshes of the screen, and pass through it, a contingency which occurs in the horizontally vibrating screens of of the ordinary fanning or winnowing machines. The invention also consists in a novel way of attaching the tailscreen to the shoe, whereby said screen may be inclined at a greater or less angle, to regulate the discharge from its end as desired.]

34,606.—C. Whipple, of Providence, R. I., and R. J. Stafford, of Smithfield, R. I., for Improvement in Machines for Combing Cotton :

We claim, first, The mode of operation, substantially as specified, by means of which a tuft of cotton, or other fibrous material, after it has been detached from the main body of the stock, is transferred to successive holding jaws, and subjected to the operation of being combed alternately on each side and both ends, as set forth.

Second, We claim the combination of a pair of vibrating feed rollers, C, with a series of jaws, B B, having an intermittent rotary motion, substantially as described, for the purpose of separating the stock to be combed into tufts.

Third, We claim giving to each series of jaws an intermittent rotary motion, substantially as described for the purposes specified.

Fourth, We claim a doffer cylinder, H, in combination with the cylinder No. 3, so arranged as to receive the several tufts after they have been combed in successive overlapping layers, preparatory to being formed into a continuous sliver.

34,607.—G. M. Zell, of Waynesville, Ohio, for Improvement in Water Elevators :

I claim the combination of the wheel or pulley, E, spout, J, and bucket, H, provided with the valve, L, and lever, N, when arranged for joint operation, substantially as and for the purpose set forth.

[This invention relates to a new and improved water elevator of that class in which a valvular bucket is elevated by means of a chain passing over a pulley. The invention consists in a novel way of adjusting the filled bucket when elevated, and operating its valve, whereby the whole or any portion of the contents of the bucket may be discharged into the trough by simply operating the crank of the pulley shaft.]

34,608.—Theodore Atteneder (assignor to himself and R. H. Gratz), of Philadelphia, Pa., for Improvement in Telescopes for Measuring Distances :

I claim the use in telescopes, spyglasses, &c., of a plain glass disk situated in the focus of the eye lens, a scale being marked on the disk and that scale so graduated as to enable the observer to ascertain the distance of an object of given dimensions.

34,609.—Jehu Brainerd (assignor to Brainerd & Burridge), of Cleveland, Ohio, for Improvement in Tanning :

I claim the use of the salix grisea for the purpuse of tanning, when prepared as set forth.

34,610.—J. R. Gill, W. E. Palmer and W. W. Webb, of Alton, Ill., for Improved Clothes Wringer :

We claim the bars, A A, provided with the jaws, B B, in combination with the jaws, M M, sockets, G G, roller bearings, D H, springs, K K, and nuts, L, fitted on the bars, A A, and all arranged for joint operation, substantially as and for the purpose set forth.

[This invention relates to an improved clothes-wringing device of that class in which pressure rollers are employed, and which are attached to the wash tub or box by means of a clamp. The object of the invention is to obtain a simple and efficient clothes wringer of the kind specified by applying or securing the device to the wash tub or box by the same means employed for graduating the pressure of the rollers.]

34,611.—W. L. Gregory (assignor to himself and Gardner Landon, Jr.), of Amsterdam, N. Y., for Improvement in Skates :

I claim the combination of the screws, B′ B′, with the runner knees, caps, D D, nuts, C C, and stock, A, in the manner shown and described.

[The object of this invention is to economize in the construction of skates. The invention relates to the means employed for securing the runner to the stock—the most expensive part of an ordinary skate—and consists in attaching wood screws to the top of the knees of the runner, and using, in connection with the screws aforesaid, nuts and sockets, all arranged to effect the desired end.

34,612.—O. J. Hall (assignor to himself and Franklin Decker), of Pittsford, N. Y., for Improvement in Railroad Chairs :

I claim clamping the two halves, C and C′, of the chair together by means of a single flat tapering key, k, as specified, when the said halves, C and C′, are matched together by a tongue and groove running horizontally under the base of the rail, as shown and described, and are provided with stops, S.

34,613.—E. M. and J. E. Mix (assignors to W. T. Huntington and Harvey Platts), of Ithaca, N. Y., for Improvement in Calender Clocks :

We claim the day-of-the-month wheel, F, having three of its thirty-one teeth progressively shorter than the remaining twenty-eight, and applied to operate substantially as specified.

34,614.—G. W. Richardson (assignor to himself and G. M. Weed), of Grayville, Ill., for Improvement in Harvesters :

I claim the finger-bar, D, segment, b, and plate, E, formed of one piece of metal or of detached pieces connected together and fitted on the axle, a, of the driving wheel, A, when said parts are combined or arranged in relation with the draft-pole, C, fitted on the axle, a, and used in connection with the pin, j, or its equivalent as and for the purpose set forth.

34,615.—Alexander Shannon (assignor to himself, T. W. Weathered and E. B. Cherevoy), of New York City, for Improvement in Cartridges for Firearms :

I claim the perforated diaphragm or diaphragms, c d, producing a sectional charge as and for the purpose specified.

34,616.—F. W. Smith (assignor to S. S. White), of Philadelphia, Pa., for Improvement in Manufacture of Dentists' Pins :

I claim the construction of the dies, d e, and their arrangement relatively to the cutters, c f, and the punch, b, substantially as specified.

[The principal object of this invention is to provide for the manufacture of pins with a head at each end suitable for artificial teeth manufactured according to the mode for which Letters Patent of the United States have been granted to S. S. White, that is to say, with heads at the outer ends of the pins, and it consists in a novel construction of dies for the manufacture of such two-headed pins.]

34,617.—J. A. Welsh (assignor to himself and R. McC. Davidson), of Xenia, Ohio, for Improved Cylinder for Grain Scouring and Thrashing Machines :

I claim a cylinder, A, for grain thrashing or scouring machine, provided with trilateral-shaped teeth, and having its outer side cast with a chill, B, as and for the purpose set forth.

[This invention consists in casting the cylinder with a chill at its outer side, whereby a cylinder is obtained which will be kept in constant working order by use; the wear of the soft portion of the cylinder causing the hard outer edges to be kept sharp or prominent.]

34,618.—N. B. White (assignor to himself and W. B. Rhoads), of South Dedham, Mass., for Improved Clothes Wringer :

I claim, first, Operating the rolls, C and D, by gears, one of which is moved vertically by the shaft of the roll, which rises and falls, substantially in the manner specified.

Second, I claim the frame, F, or its substantial equivalent, through which the power of the spring, e, is brought to bear on the roll, which rises and falls, for the purpose set forth.

34,619.—J. P. Comly, of Dayton, Ohio, for Improvement in Treating Flax and Hemp to make them resemble Cotton :

I claim cutting flax or hemp straw before it is broken, so as to separate the seed ends from the residue of the stock, and divide the fiber into equal or nearly equal lengths suitable for spinning by ordinary cotton spinning machinery, as and for the purpose specified.

RE-ISSUES.

1,284.—T. B. Bleecker (assignor to New York Wire Railing Company), of New York City, for Improvement in Folding Bedsteads. Patented April 17, 1847. Re-issued July 24, 1860, and Extended :

I claim, first, The folding frame hinged in the center and setting within the corner posts, when such frame is connected directly to the posts themselves by journals or bolts on which the parts turn in folding or unfolding, as set forth.

Second, The hooked-shaped ends to the side rails of the frame hinged in the center-taking bolts or journals attached to the posts and forming hinges for the same, or for allowing said frame to be disconnected from the posts, as specified.

Third, In a bedstead wherein a frame is employed that is hinged to fold as set forth, and hinged at its ends directly to the posts, the use of a fastening or brace that retains the hinged frame and posts in their proper relative position, as set forth.

Fourth, In a bedstead where the head and foot guards are constructed substantially as specified, and the bottom is made of a frame hinged to fold in the center as set forth, locating the journal or bolt, b, on the post, so that the bedstead, when folded, will stand upright, as specified.

1,285.—S. H. Miller, of Hanoverton, Ohio, for Improvement in Governors for Steam Engines. Patented Sept. 11, 1860 :

I claim the employment, in combination with the described system and arrangement of sliding sleeve, B, arms, E E′, balls, F F′, and links, D D′, of a spring or springs, applied to operate substantially as and for the purpose specified.

[The object of this invention is to construct a governor for stationary portable or marine engines or other motors, the operation of which will not be materially affected by placing its axis in a horizontal or any inclined position, or by the motion of a vessel at sea on board of which

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it may be applied; and it consists in a certain system and arrangement of a sliding sleeve, arms, links and balls, in combination with a spring or springs, for producing centrepetal force, whereby the desired result is obtained.]

DESIGNS.

1,548.—Henry Hebbard, of New York City, Design for Spoon or Fork Handles.

EXTENSIONS.

5,459.—Robert Hillson, of Albany, N. Y., for Improvement in Hot-Air Furnaces. Patented Feb. 29, 1848:

I claim, first, The invention of a grate with a hemispherical or conical projection or boss rising upward in the center thereof; the part of the grate outside of said boss being flat, as an improvement upon former grates, which are either flat or hemispherical or hemicylindrical both the flat part and the projecting part of my grate being grated.

Second, I claim the use of the circular rim which rests upon a circular opening in the bed plate and moves circularly thereon, and upon which the grate hangs by pivots resting on sockets in the rim, as above descrioed, as an improvement upon the former mode by which the grate rested by its sockets immediately on the bed plate.

Third, I claim the manner described of dumping the grate by means of the cross bars and handles and the ways or projections for the cross bars to move upon, the grate being suspended in the manner set forth.

Fourth, I claim the separate air chamber marked A, Fig. 1, constructed against the side of the lower cylinder which may be extended to the top of the upper cylinder, for the purpose of heating an adjoining room, as described.

Fifth, I claim the connecting of the part of the furnace below the fire, by means of a continuous air passage and pipe with the room to be heated, so as to draw from that room solely the air for the support of the fire, for the purpose of creating a draft into that room of the hot air from the furnace, as described.

Sixth, I do not claim the cylindrical box or drum, called the hot-air circular, and represented in Fig. 5, nor do I claim the smoke circular represented in Fig. 6; but I claim the combination of this smoke circular with this cylindrical box or drum, in the manner and for the purposes described.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principe office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

C. H. J., of Ohio.—If there was a hole directly through the diameter of the earth and a ball were dropped into it at the surface, were it not for the resistance of the air the ball would pass through to the surface on the other side, and then return; continuing to oscillate forever. But in consequence of the resistance of the air, the oscillations would gradually diminish in extent, and the ball would finally rest at the center.

J. B., of Mich.—We are not aware that Mr. Chadwick's pamphlet on education has been published in this country; but D. Appleton & Co., or any of our leading booksellers, would import a copy for you. We believe that a republication of it in the U. S. would prove profitable.

S. B. B., of Pa.—After your patent has expired you can prosecute all parties who had previously used it.

E. E. S., of Mich.—The idea of casting types into words is not new. Small words have been cast in this manner but printers do not like them for some reason.

T. H. K., of N. Y.—We are not acquainted with the method employed by Prof. Percy for uniting phosphorus with copper and making an alloy.

D. B. W., of N. Y.—There is no good work published so far as we know on graining, varnishing, polishing and painting in general. We have not heard of the Cosmopolitan Art Association, for a long period.

W. D., of Iowa.—The target you send us is a very excellent one indeed and shows that you have some sharp shooters still left in your place. We will hang it up in our office for the curious to look at, but shall omit its publication.

J. H. B., of C. W.—The brass coloring which you have observed on the head of Sheffield axes, &c., is produced with lacquer, which is simply lac varnish colored with turmeric.

J. R. T., of Cuba.—There have been various constructions of apparatus for raising water by the direct pressure of steam, and we do not discover any patentable novelty in that described in your letter, which can doubtless be made to repeat the process as you suggest. We think it possible that the cut-off could be operated by a float. Practice shows all such apparatus to be very inferior to pumps owing to its liability to get out of order.

P. S., of Pa.—We have no positive knowledge of the composition of the fulminates used in the Prussian needle cartridges but suppose it is nearly the same as is used for percussion caps with perhaps a little more chlorate of potash. The composition for caps is fulminating mercury 3 parts; chlorate of potash 5 parts; sulphur 1 part; and powdered glass 1 part.

S. P. B., of Mich.—All soaps are "chemical soaps." The particular article to which you refer for cleansing greasy waste contains an excess of alkali. It is made by adding to dissolved hard soap, or common soft soap, caustic alkali made by dissolving soda in water, and adding thereto an equal weight of slacked lime, then stirring the two together, allowing the lime to settle and afterward pouring the clear liquor among the soap. One pound of soda is sufficient for two gallons of soap. Such soaps have been called "labor saving." They answer very well for greasy waste and coarse cotton articles, but should not be used for fine linen goods because the strong alkali tends to render them yellow in appearance.

F. & R., of Conn.—Water will flow from an opening in the side of a flume with the same velocity that a body would have at the level of the opening falling from the level of the surface. This velocity is equal to the square root of the product of the hight multiplied by 64.33, and for one foot is equal to 8.02 feet per second. The area of your opening 24 inches long by 2½ inches wide, is 60 square inches, but under this low head through so large an opening, only about ⅔ of the theoretical quantity of the water would issue, owing to the contraction of the vein, 40 square inches is 0.28 square feet, which multiplied by 8.02 gives 2.24 cubic feet per second, or 135 cubic feet per minute. A cubic foot of water weighs 62½ lbs. so that you have 8,432 lbs. per minute, which falling 7 feet gives 59,024 foot pounds per minute, and this divided by 33.000 lbs.—one-horse power—shows the power of your water 1.788 horse-power. A pretty good over-shot wheel will yield about 60 per cent of the power of the water, making 1.07, or just about one-horse power. These data will enable any one having a knowledge of the simple rules of arithmetic to make the other calculations that you require. The reduction from the theoretical flow varies with the size and altitude of the openings, and all these elements must be known in order to make an accurate calculation. In order to obtain the same quantity of water under a one-foot head as you obtain under a 9-foot head through a gate of 200 square inches, the gate opening will have to be ten times as large or 2,000 square inches.

G. R. C., of Mich.—The best mortar for laying fire brick in a furnace, is fire-clay reduced to a proper consistency with water The clay used for making porcelain also answers very well.

R. A., of Pa.—So far as our observation has extended, we have not noticed any loss of the power of steam when conveyed from the boiler to the cylinder by a crooked pipe. We have not, however, made such observations on a steam pipe as long "as 200 feet." We think you will find some reduction of the pressure of steam after being conveyed such a distance, if the pipe has several elbows on it. This will show a loss of power.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000; Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, March 12, 1862:—

A McG., of N. Y., $35; J. D. C., of Conn., $20; J. S., of N. Y., $45; R. G., of N. Y., $20; C. C. C., of Iowa, $25; J. A. L., of N. Y., $25; C. and F., of Iowa, 25; S. S. T., of Cal., $62; J. Z., of Ill., $25; T and D., of Nevada Ter., $30; L. F. L., of Ill., $25; W. S., of N. J., $10; H. and M., of N. Y., $10; A. L. W., of Mass., $115; J. G., of R. I., $10; W. H. C., of N. Y., $25; C. C., of Ill., $25; E. Y., of N. Y.. $25; S. A. B., of Conn., $45; W. E. B., of R. I., $25; A. C. McQ., of Ill., $15; W. H. P., of N. Y., $25; J. O. F., of N. Y., $25; M. La P. and V., of N. Y., $25; O. R. B., of N. Y., $20; E. G., of Mass., $45; E. C. H., of N. Y., $15; G. H., of N. Y., $25; J. P., of N. Y., $60; H. T. P., of Conn., $35; C. and A., of Conn., $15; A. B., of Conn., $40; A. C., of N. Y., $25; T. Y. and others, of Pa., $10; E. B., of Cal., $15; S. S., of Mass., $15; E. F. B., of Conn., $25; S. H., of Ind., $25; A. B., of N. Y., $15; R. T. H., of Mass., $25; O. N.. of N. Y., $15; L. H., of Ill., $25; P. L. K., of Ill., $20; A. J., of Iowa, $15; W. B. W., of Mass., $15; G. H., of N. Y., $25; H. S., of N. Y., $25; J. M., of N. Y., $25; C. E. B., of Conn., $20; W. H. R., of N. Y., $55; C. H. P., of N. Y., $15; C. F. B., of Conn, $10; J. B., of N. Y., $25; A. N. P., of Ill., $10; W. B. B., of Ill., $25; J. B. R., of N. Y., $275; J. P. A., of Ill., $15; G. T., of Mass., $15; A. and F., of Me., $28; A. G. B., of Conn., $30; F. G., of Mich., $15; J. W. K., of Mich., $25; E. C. F., of Mass., $28; H. T. P., of Conn.; $100; G. N. C., of Conn., $25; G. A. L., of N. Y., $280; J. R. A., of Pa., $40; A. A. D., of N. J., $15; C. H. B., of Mass. $15; W. B., of L. I., $10; C. S., of N. Y., $25; J. S. T., of N. Y., $10.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from March 5 to Wednesday, March 12, 1862:—

W. H. R., of N. Y.; G. H., of N. Y.; C. and F., of Iowa; J. B., of N. Y.; H. S., of N. Y.; A. C., of N. Y.; J. H. T., of Switzerland; E. F. B., of N. Y.; A. B., of Conn.; L. H., of Ill.; J. G. Sr., of R. I.; R. T. H., of Mass.; J. M., of N. Y.; E. H. and D. R. W. W., of Wis.; C. S., of N. Y.; H. T. P., of Conn.; C. C. C., of Iowa; L. F. L., of Ill.; A. N. P., of Ill.; M. La P. and V., of N. Y.; C. H. B., of Mass.; C. C., of Ill.; R. G., of N. Y.; J. W. K., of Mich.; E. F. B., of Conn.; W. H. P., of N. Y.; W. B. B., of Ill.; J. A. L., of N. Y.; J. O. F., of N. Y.; J. Z., of Ill.; J. S. T., of N. Y.; A. and F., of Me.; G. N. C., of Conn.; W. E. B., of R. I.; S. H., of Ind.; C. F., of Wis.

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TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design atents, when two good drawings are all that is required to accompany he petition, specification and oath, except the government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when he time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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WILL V. J. M., OF OHIO, WHOSE INQUIRY CONcerning scale on steam boilers was answered in the SCIENTIFIC AMERICAN of March 8, 1862, please address JAMES F. LEVIN, No. 23 Central wharf, Boston, Mass. 1*

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NEW YORK EMERY WHEEL COMPANY,
MANUFACTURERS OF
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Patented Jan. 7, 1862.

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MORGAN IRON WORKS, NEW YORK, Nov. 30, 1861.

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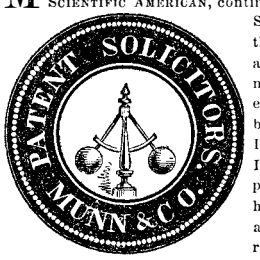

Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite th United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with th Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

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The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

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Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,
Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.

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The Rebel Steamer "Merrimac."

On page 304 of our last volume we published an illustration af the iron-plated steamer *Merrimac* which made such sad havoc with several of our war vessels on Saturday night. We reproduce the engraving as being the most interesting subject of any thing with which we could fill our pages at the present time. The engraving was made from a sketch drawn by one of the mechanics who worked on the vessel when it was being iron plated.

It will be remembered that the *Merrimac* was one of our first class war vessels which was partially burned and then sunk at the time that the Gosport Navy Yard was destroyed to prevent it from falling into the hands of the rebels. She was a fine screw frigate, of 3,200 tuns burthen, carrying 40 large guns. The rebels, after considerable effort, succeeded in raising her, and have plated her with railroad rails inclined at a sharp angle. This armor in the recent severe trial seems to have afforded very efficient protection against the heaviest artillery at very short range. The mechanic who made the sketch described her armament as consisting of 11-inch guns, and two 100-pounder Armstrong guns. In regard to the Armstrongs he was probably mistaken, as it is understood that all those weapons that have been made were made for the British government. He said that she had a sharp steel projection at the bow for the purpose of piercing the sides of vessels; and in this he was correct, as it was with this projection that the *Cumberland* was pierced and sunk.

In connection with this illustration we also give a correct picture of the *Monitor*, sketched by our own artist previous to her departure to Fortress Monroe. A thrilling account of the contest of the *Monitos* with the *Merrimac* may be found on another page.

Lubricators for Bullets.

Formerly, tallow combined with wax was generally used as the lubricating composition for cartridges. It answered very well when the old brown-bess musket was in general use, but since the rifle has become the general weapon of the soldier, this lubricating compound has proved to be unfit for cartridges. When tallow is kept in contact with a lead bullet it exerts a carroding action on the metal and a crust forms on the bullet thus increasing its size and rendering it incapable of being rammed down, with care and rapidity in a rifle. It has been found that paraffine does not exert any chemical action upon the lead, and hence it is now very generally employed as the best cartridge lubricant. It is one of the products of petroleum and coal oils.

MR. COBDEN has promised to bring the decimal coinage question before Parliament during the ensuing session.

Tempering Bronze.

Bronze is a term usually applied to alloys of copper and tin, in contradistinction to brass, which is a compound of copper and zinc. Bronze has been longer known than iron. It was employed by the remote ancients for arms, swords, shields and almost every kind ot cutting instrument; and also for works of art. A bronze compound of 93 parts copper, by weight, and 7 of tin, is harder than copper, and yet it is more fusible. This alloy can be tempered and rendered very hard by the very opposite process of hardening steel. The bronze is first highly heated, then cooled very slowly, when it becomes hard and brittle. The same treatment would render steel soft. In order to soften or anneal bronze it is heated to redness, then plunged into cold water, when it becomes so soft that it can be stamped in a die press.

Bell metal, gun metal and statue metal are simply bronze—alloys of copper and tin. These two metals combine in almost every proportion. Bell metal contains 78 parts copper and 22 tin, and some makers add 1 per cent of antimony. Gun metal is composed of 8 parts copper and 1 of tin.

Speculum metal is a very hard bronze, which receives a very brilliant polish, and is employed for reflectors in telescopes. It is composed of 6 parts copper, 3 of tin and 1 of arsenic.

Flax Culture in Illinois.

A correspondent in an Chicago paper gives his experience with flax last year—the first experience which he had with raising it in Illinois—although he had grown it for several years previously in Ohio. He says:—In April I plowed my ground and sowed my flax in May, half a bushel to the acre, as follows: one and one-half bushel to three acres, on second sod, and the balance one-half bushel on one acre of old ground, which was very mellow, having been planted in potatoes the previous year. From the one acre of old ground I harvested 16½ bushels of good seed, and from the three acres of sod 30 bushels, making 46½ bushels as my whole crop One-half bushel of seed is sufficient for one acre of ground.

I think flax growing profitable for seed alone, and if we had machinery for working up the fiber there would be a great additional profit. The following is my account with the crop:—

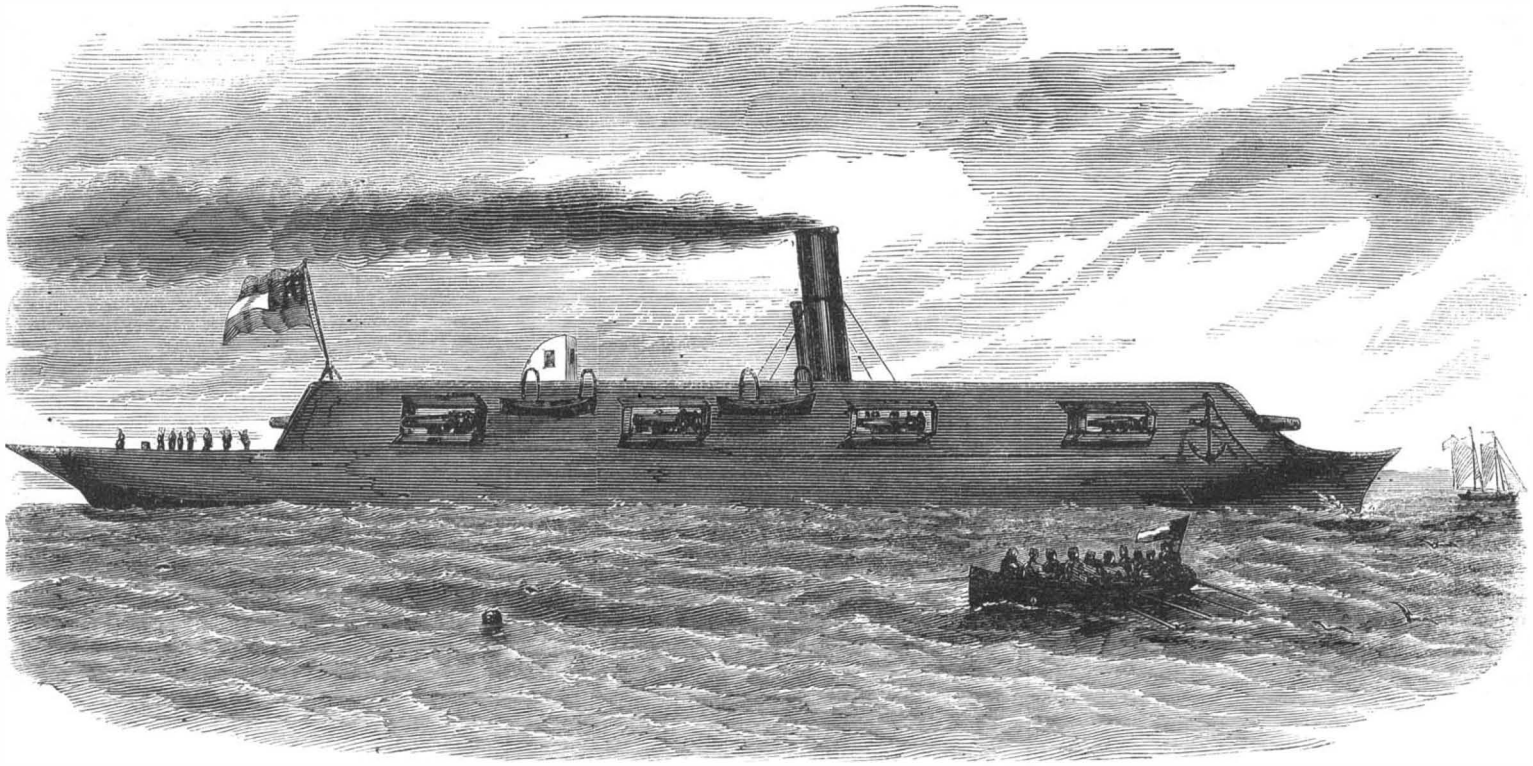
EXPENSE OF CULTURE.

Plowing four acres at 75 cents per acre	$3 00
Harrowing and sowing	3 00
Cutting	2 00
Trashing and cleaning	5 00
Call seed $1 per bushel	2 00
Total	$15 00
Value of 46½ bushels at $1	46 50
Profit on four acres of ground	$31 50

The ground upon which this was sown was a black loam, plowed as before stated, and harrowed once before and once after sowing, with a fine-tooth harrow. The crop was cut with a common grain cradle, though a reaper will work well in it. Upon the whole I conclude that flax can be grown upon the prairies of Illinois with success.

I will state that the whole crop has been loaned in this neighborhood to be sown next spring

LARGE deposits of superior porcelain clay have been discovered near Grand Rapids on the Wisconsin river.



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FROM THE STEAM PRESS OF JOHN A. GRAY.

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